

# Team report of Twaves 2005

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<http://www.okadanet.jp/twaves/>

## 1. Introduction

### 1.1 Members

#### Professors

Dr.Hiroyuki Okada and Dr.Satoshi Matumoto



#### Undergraduate Students

Jun Oh-hara, Takae Hayashi, Toshiya Katsurada, Shun-suke Nakayama,  
Shou Shibata, Katsuhiko Suzuki and Ayami Yokoyama

#### Technician

Yasutomo Omori



### 1.2 Team Introduction

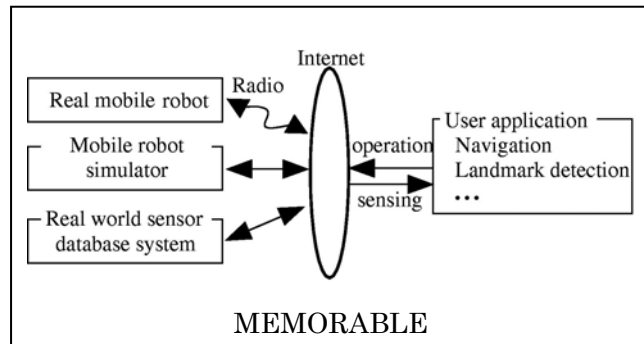
Our team, Twaves2005, consists of students of Tokai University. You can see more information our web page <http://www.okadanet.jp/twaves/>.

We began to develop the program using AIBO, July 2004. It is the newcomer of the first participation.

## 2 Research Topics

### 2.1 Multilevel Environment for Mobile Robotics Capability Experiments (MEMORABLE)

Mobile robots are equipped with many receptors, including sonar, infrared, touch, and visual sensors. The robots function by applying not only the navigation and



other simple and relatively quick information processing tasks requiring information about nearby surroundings obtained within a short period of time, but also the planning and implementation of tasks requiring higher-level information processing involving a wider time span. In this regard, mobile robots are the optimum subjects for studies on information integration and autonomous learning systems, both theoretical studies and studies at the algorithm level.

However, mobile robots require a great amount of labor and high degree of skill for maintenance of their mechanisms and for preparation of their operational environment. These requirements are a great burden on researchers. In addition, considering the speed at which existing robots can move, it would be difficult to conduct trial-and-error studies with only actual robots.

Mobile robot simulators were used to solve these problems. They generated data for theoretical verifications in a virtual environment. However, every researcher who considered using a simulator has found it almost impossible to simulate a highly realistic and accurate real-world environment having robots, or to simulate robot motions that take into account all of the complexities of the real world. A conventional simulator merely reproduces robot motions for a world based on an extremely simplified model. To simulate an environment with a lot of complexities,

To fill the gap between experiments using actual mobile robots and simulations of the robots, the authors constructed a network-distributed mobile robot experimentation system (MEMORABLE: Multilevel Environment for Mobile Robotics Capability Experiments). The system uses a real-world information database composed of sensor data collected by actual mobile robots in a physical environment.

MEMORABLE consists of the following components connected via the Internet:

- Actual mobile robot (AIBOs)
- Mobile robot simulator
- Real-world sensor database system

The real-world sensor database system has the characteristics of an actual mobile robot and of simulations. By combining the database system with the actual mobile robot and the mobile robot

simulator according to their objectives, researchers can conduct their individual studies and then compare the results of many different cases. MEMORABLE handles the complexities of the real world using data actually measured by sensors, thereby decreasing processing time to less than that in a simulator.

## 2.2 Two Dimensional Evaluation Reinforcement Learning

Reinforcement learning refers to general learning to obtain appropriate action strategies by trial and error without an explicit target system model; instead, learning is accomplished using rewards obtained in the execution environment as the result of self-generated actions.

This learning method is now being actively studied as a framework for autonomous learning because actions can be learned using only scalar evaluation values and without explicit training.

The purpose of reinforcement learning is to maximize the total rewards depending on the present and future the environment. This kind of learning has two properties.

One is optimality (exploration), that is, to ultimately obtain as many rewards as possible. The other is efficiency (exploitation), which is to obtain rewards even in the middle of the learning process.

These properties are in a tradeoff relationship.

If exploration is overemphasized, convergence into an optimum policy is much longer as the environment becomes more complicated. Furthermore, only small rewards can be obtained in the learning process. Conversely, if exploitation is always emphasized, the learning results decrease to the local minimum and no optimum policies may be available at the end of the learning process.

Knowledge obtained from rats and monkeys about operand-conditioned subjects and from humans having damaged brains indicates that distinguishing between the evaluations of successes and failures has a tremendous effect on action learning.

With this in mind, the authors propose reinforcement learning by a two-dimensional evaluation. This evaluation involves an evaluation function based on the dimensions of reward and punishment. An evaluation immediately after an action is called a reward evaluation if its purpose is to obtain a favorable result after repeated attempts to learn an action, or punishment evaluation if its purpose is to suppress an action.

### 2.2.1 Search by Interest and resource allocation

Two-dimensional reinforcement learning basically consists of two aspects. One is to distinguish between reward evaluation and punishment evaluation forecasts. The other is to determine an action according to the combined index of positive and negative reward forecasts.

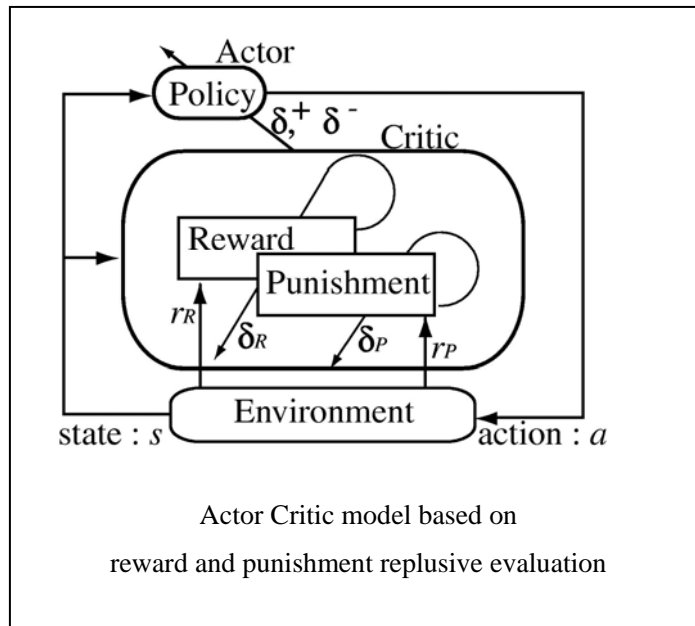
The conventional reinforcement learning method uses only the difference (Utility) between reward and punishment reinforcement signals in an evaluation to determine an action. In comparison, the

proposed method determines the sum (Interest) of reward and punishment evaluation signals and considers it as a kind of criticality.

### 2.2.2 Distinction of the time discount ratio of forecast reward

In reinforcement learning, a forecast reward is discounted more if it's more likely to be received in the future. This discount ratio is called the time discount ratio (hereinafter called gamma) of the forecast reward. The value of gamma ranges from 0 to 1.0.

In many practical problems, a reward reinforcement signal is related to the method used to move toward a goal and a forecast reward signal is used for learning a series of actions to reach the goal. To consider the effect of a goal that is far away, the gamma setting must therefore be large. Meanwhile, if a punishment reinforcement signal for avoiding a risk has an effect too far away from the risk, an avoidance action may be generated in many input states. In turn, the search range of the operating subject is reduced, thereby lowering the performance of the subject. Therefore, to generate a punishment reinforcement signal for initiating an action to avoid an obstacle only when the obstacle is immediately ahead, the value of gamma must be small in the signal.



# Appendix



## RoboCup 2005 World Competition

### ~Interview~

1. Belong to (Name of Univ or Lab)
2. Organization
3. Experience of RoboCup
4. Panelist's name and part
5. Team's Characteristic
6. Strong points (field)
7. Strong points (motion)
8. Special performance
9. Team's goal
10. Address
11. Photo

<b>1. ARAIBO ( Japan )</b>	
<b>1</b>	The University of Tokyo and Chuo University
<b>2</b>	No Info
<b>3</b>	They formed a team in 1999. They participated in RoboCup1999 Stockholm, RoboCup2000 Melbourne(4 <sup>th</sup> ), RoboCup2001 Seattle, RoboCup2002 Fukuoka, RoboCup2003 Padua, RoboCup2004 Lisbon, RoboCup2005 Osaka.
<b>4</b>	Mr. Ryuichi Ueda ( Assistant prof )
<b>5</b>	Member said that they often play a dirty trick or foul play. They often cheer their team and give their the bird.
<b>6</b>	Generation of walking, Scheme of Behavior, Independent estimate location
<b>7</b>	No Info
<b>8</b>	No Info
<b>9</b>	<b>Advanced Robots with Artificial Intelligence for Ball Operation</b>
<b>10</b>	<a href="http://www.arai.pe.u-tokyo.ac.jp/RoboCup/index_r.htm">http://www.arai.pe.u-tokyo.ac.jp/RoboCup/index_r.htm</a>
<b>11</b>	Photo

## 2. ASURA ( Japan )


1	Kyushu Institute of Technology, Fukuoka Institute of Technology
2	16 members ( 15 students, 1 prof )
3	They started to study in 2001. They participated in RoboCup2001 Seattle(Qualifier), RoboCup2002 Fukuoka(Qualifier), RoboCup2003 Padua, RoboCup2004 Lisbon, RoboCup2005 Osaka.
4	Yasuyuki Ogihara (Team Leader) : Management and Presiding team, In charge of Challenge
5	All members of this team have own another study but AIBO project in the different lab.
6	Original Tool (For segmentation image, For robot's behavior, etc...)
7	No Info
8	Nothing
9	To advance to the finals at international competition is their immediate goal.
10	<a href="http://www.asura.ac/">http://www.asura.ac/</a>
11	 

### 3. Baby Tigers DASH ( Japan )


1	Osaka University and Osaka City University
2	No Info
3	They have been participating RoboCup since this league was founded in 1998. RoboCup2001 Seattle – Qualifier
4	Hirohumi Hukumoto : Team leader
5	They aid to do team play and want to play strategically.
6	Recognition the ball
7	No Info
8	They have motions which robot stands on his hands or dabble his hands when they score.
9	No Info
10	<a href="http://www.er.ams.eng.osaka-u.ac.jp/robocup/BabyTigers/">http://www.er.ams.eng.osaka-u.ac.jp/robocup/BabyTigers/</a>
11	

<b>4. Cerberns ( Turkey )</b>	
<b>1</b>	Bogozici University, Department of Computer Engineering.
<b>2</b>	H. Levent Akin ( Professor )
<b>3</b>	No Info
<b>4</b>	Cerberns is strong in Localization System, and their robots can walk fast.
<b>5</b>	Not research
<b>6</b>	Not research
<b>7</b>	There are many pattern of fast walking.
<b>8</b>	No Info
<b>9</b>	No Info
<b>10</b>	No Info
<b>11</b>	Photo

## 5. CM Dash ( U.S.A )

1	Carnegie Mellon University
2	5 members (include 4 students)
3	They participated in RoboCup1998 Paris, RoboCup1999 Stockholm, RoboCup2000 Melbourne, RoboCup2001 Seattle(2nd), RoboCup2002 Fukuoka(Championship), RoboCup2003 Padua(4th), RoboCup2004 Lisbon(Quarlier), RoboCup2005 Osaka.
4	Douglas Vail : : Vision, Low level behavior
5	Reporter felt This team is very earnest.
6	Multi agent behavior
7	Powerful swing and kick for shoot, Clear motion
8	For win : dance, for loss : look like ashamed behavior
9	To increase components, To build whole system, To make independent system
10	<a href="http://www-2.cs.cmu.edu/~robosoccer/main/">http://www-2.cs.cmu.edu/~robosoccer/main/</a>
11	

## 6. Dutch AIBO Team ( The Netherlands )

1	DECIS Lab
2	No Info
3	They started to study in 2004. They participated in RoboCup2004 Lisbon and RoboCup2005 Osaka.
4	Niek Wijngaards ( PhD, Researcher ) : Team Leader
5	No Info
6	Behavior based vision
7	Special shoot, Kick, Speedy run
8	Wag his arm happily
9	Member said, “ Callaborative Autonomous Intelligent system. Soccer = Validation of research results. We do other research, two legs, small helicopter, etc... See also <a href="http://www.decis.nl">www.decis.nl</a> .”
10	<a href="http://www.dutchaiботeam.nl/robocup/">http://www.dutchaiботeam.nl/robocup/</a>
11	写真 

## 7. Eagle Knights ( Mexico )

1	ITEM (Institute Tecnologico Autonomo de Mexico )
2	4 members
3	They dicided to start AiBO project. They participated to RoboCup2004 for the first time, and also they advanced to the 2nd stage preliminary.
4	Adrian Martines : Vision system, Localization system
5	Their AIBO can often touch the ball, because they are good at finding the ball. However it is a problem that they don't hit in a detection to goal every time. As the ball often out, it may be the boring game.
6	Recognition the ball
7	GK
8	Nothing special, but they hope to make it. Because this project is also things to amuse a audience.
9	Communication between robots, To improve strategy
10	<a href="http://robotica.itam.mx/ingles/index.phtml">http://robotica.itam.mx/ingles/index.phtml</a>
11	

**8. FC Portugul ( Portugul )**


<b>1</b>	University of Porto, Faculty of Engineering
<b>2</b>	4 member ( uncertain )
<b>3</b>	2002 : 4 legs league in U.S.A 2003 : RoboCup : Qualifier
<b>4</b>	Reinaldo
<b>5</b>	They are programing emergence of last behavior based on last creature.
<b>6</b>	No Info
<b>7</b>	Dive kick, Speed flipper kick when defender, behavior in defence
<b>8</b>	No Info
<b>9</b>	No Info
<b>10</b>	<a href="http://www.ieeta.pt/robocup/">http://www.ieeta.pt/robocup/</a>
<b>11</b>	

**9. German Team ( Germany )**

1	Humbold University Berlin, Universitat Bremen, Technische Universitat Darmstadt, Dortmund University
2	36 members
3	They participated in RoboCup2001 Seattle, RoboCup2002 Fukuoka(Qualifier), RoboCup2003 Padua(Qualifier), RoboCup2004 Lisbon(Championship), RoboCup2005 Osaka.
4	Benjamin : Behavior and Making atmosphere of team
5	They are the regular team in RoboCup. They have been winning two successive games. All members have own share of work, and this team is perfect.
6	Localization, Application of Monte-Carlo method
7	Head kick, very fast beautiful walk
8	There are so many behavior (ex. Waving his hands)
9	To participate in the competition as the independent team, not joint team.
10	<a href="http://www.germanteam.org/">http://www.germanteam.org/</a>

11

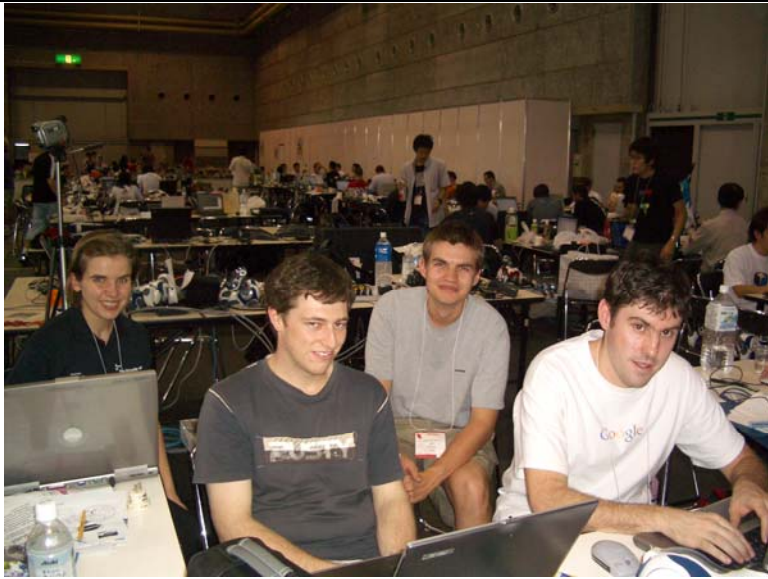



<b>10. Hamburg Dog Bots ( Germany )</b>	
1	University of Hamburg
2	8 members (7 students, 1 assistant prof)
3	They participated in RoboCup2003 Padua, RoboCup2004 Lisbon(Qualifier) and RoboCup2005 Osaka.
4	Janis Schoneteld : Localization, Strategy
5	Nothing special
6	Focus vision
7	Mediums speed walk, Shoot motion more than 20
8	They have many behavior (ex. Shaking head)
9	Focus localization, To participate to next RoboCup too
10	<a href="http://www.informatik.uni-hamburg.de/TIS/index.php?content=robocup/index.htm">http://www.informatik.uni-hamburg.de/TIS/index.php?content=robocup/index.htm</a>
11	



<b>11. Jolly Pochie ( Japan )</b>	
<b>1</b>	Kyusyu University, Touhoku University
<b>2</b>	
<b>3</b>	They participated in RoboCup2003 Padua, RoboCup2004 Lisbon, RoboCup2005 Osaka.
<b>4</b>	Ayumi Shinohara (prof) : Team Leader, Akira Ishino (assistant prof)
<b>5</b>	This team is particular about Originality. They aim to develop as the academical research.
<b>6</b>	They pride themselves that they have been building their own whole system from scratch. They have been using Script since a year ago.
<b>7</b>	They have a large shoot motion, especially using his head.
<b>8</b>	They have many acrobatic behaviors (ex. Walking like crab, Somersault, etc...), but they are hiding it now.
<b>9</b>	At first, to advance to the finals. Finally, to be champion team. And to go overseas by a good thesis. They said "We just wanna trip!!"
<b>10</b>	<a href="http://www.i.kyushu-u.ac.jp/JollyPochie/">http://www.i.kyushu-u.ac.jp/JollyPochie/</a>
<b>11</b>	


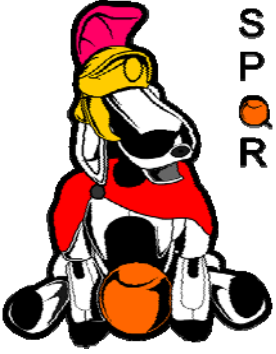
<b>12. Les3 Monsquetaires ( France )</b>	
<b>1</b>	University of Versailles, Laboratoire de Robotique de Versailles(Robotics Laboratory of Versailles)
<b>2</b>	Only 3 people
<b>3</b>	They participated to RoboCup1998 Paris(2nd), RoboCup1999 Stockholm(Champ), RoboCup2000 Melbourne(2nd), RoboCup2001 Seattle(4th), RoboCup2002 Fukuoka, RoboCup2003 Padua, RoboCup2004 Lisbon and RoboCup2005 Osaka.
<b>4</b>	Vincent HUGEL (Assistant Prof)
<b>5</b>	They are a veteran team which has been participating since RoboCup project started. Their program is perfectly original. They named the team “Les3 Monsquetaires” after a great historic person. “Monsquetaires” means “musketeers” in English. For further information, see bellow. ( <a href="http://www.online-litature.com/dumas/threemusketeers/">http://www.online-litature.com/dumas/threemusketeers/</a> )
<b>6</b>	Locomotion, Vision, Segment color
<b>7</b>	No Info
<b>8</b>	No Info
<b>9</b>	To contribute the research about Autonomy Intelligence more.
<b>10</b>	<a href="http://www.lrv.uvsq.fr/research/legged/robocup.php">http://www.lrv.uvsq.fr/research/legged/robocup.php</a>
<b>11</b>	


<b>13. Mipal ( Australia )</b>	
<b>1</b>	Griffith University
<b>2</b>	No Info
<b>3</b>	They started this study from 2003.
<b>4</b>	Vladimir Estill – Castro (Prof) : Team Leader, Management team, Head Control
<b>5</b>	They often cheer their team during the game. They said that they have confidence in The Challenge.
<b>6</b>	Vision system, very small classification color, Analysis pixels (very few) They can classify all color within 5 min.
<b>7</b>	Strong kick ( They scored a goal on this kick in the game with German Team ), Penalty shot
<b>8</b>	Nothing special
<b>9</b>	To try to develop human computer interface.
<b>10</b>	<a href="http://www.griffith.edu.au/school/ict/mipal/home.html">http://www.griffith.edu.au/school/ict/mipal/home.html</a>
<b>11</b>	


<b>14. NUBots ( Australia )</b>	
1	University of Newcastle
2	5 members
3	They participated to RoboCup2002 Fukuoka(3rd), RoboCup2003 Padua(3rd), RoboCup2004 Lisbon(3rd) and RoboCup2005 Osaka(2nd).
4	Stephen Young
5	The name NUbots stand for <b>Newcastle University robots</b> and is the name of the robot soccer competition team of the Newcastle Robotics Lab., Australia, since 2002.
6	No Info
7	Head truck ball, Looking around
8	Strike a victory pose
9	No Info
10	<a href="http://robots.newcastle.edu.au/index.html">http://robots.newcastle.edu.au/index.html</a>
11	 


<b>15. rUNSWift ( Australia )</b>	
<b>1</b>	University of South Wales
<b>2</b>	9 members (comprise 3 staff)
<b>3</b>	They participated in RoboCup1999 Stockholm(2nd), RoboCup2000 Melbourne(Champion), RoboCup2001 Seattle(Champion), RoboCup2002 Fukuoka(2nd), RoboCup2003 Padua(Champion), RoboCup2004 Lisbon(Qualifier) and RoboCup2005 Osaka(3rd).
<b>4</b>	Blad Hall : Manager
<b>5</b>	rUNSWift has been the world champion more than any other team.
<b>6</b>	Switching vision
<b>7</b>	P-walk (walk by his elbows)
<b>8</b>	Nothing special
<b>9</b>	No Info
<b>10</b>	<a href="http://www.cse.unsw.edu.au/~robocup/2005site/index.phtml">http://www.cse.unsw.edu.au/~robocup/2005site/index.phtml</a>
<b>11</b>	

<b>16. SpelBots(USA)</b>	
<b>1</b>	Spelman College in Atlanta, Department of Computer Science.
<b>2</b>	7 members (6 students and 1 derector)
<b>3</b>	Osaka competition is their first participation.
<b>4</b>	Aryen Moore – Alston ( Team leader )
<b>5</b>	Members of SpelBots are all woman. They haven't been studied this project for 1 year yet. They are using the <a href="#">Tekkotsu</a> .
<b>6</b>	No Info
<b>7</b>	No Info
<b>8</b>	No Info
<b>9</b>	No Info
<b>10</b>	<a href="http://www.spelman.edu/~spelbots/">http://www.spelman.edu/~spelbots/</a>
<b>11</b>	 



<b>17. SPQR+Sicilia ( Italy )</b>	
1	Universita de Roma "La Sapienza" (University of Roma "Wisdom")
2	10 members (9 students, 1 prof)
3	They started to study RoboCup project in 2000. They participated in RoboCup2001 Seattle(Qualifier), RoboCup2002 Fukuoka, RoboCup2003 Padua(Qualifier),RoboCup2004 Lisbon and RoboCup2005 Osaka.
4	Luca Iocchi ( Assistant Prof ) : Management, Combination
5	Almost all the members are studying in computer science, not engineering. In 2005 SPQR+Sicilia is a joint effort of two Italian research groups: University of Rome "La Sapienza" and University of Palermo.
6	Coordination, Communication
7	No Info
8	Nothing special, as they have no time for it.
9	Autonomy Intelligence, Development as academic research
10	<a href="http://www.dis.uniroma1.it/~spqr/">http://www.dis.uniroma1.it/~spqr/</a>
11	 

<b>18. Team Chaos ( Sweden and Spain )</b>	
1	University of Murcia, University Rey Juan Carlos, University of Alicante
2	10 members (5 students, 4 prof, 1 assistant)
3	They participated in RoboCup2004 Lisbon and RoboCup2005 Osaka.
4	Humberto Martinez Barbera : Team Leader, Fixer
5	This team was been organizing only the Swedish until 2 years ago, but it is the joint team of Swedish and Spanish now.
6	Localization, Finding the far ball
7	No Info
8	Nothing special, as they have no time for it.
9	Soft component for robot's behavior, Fortification of localization
10	<a href="http://www.aass.oru.se/Agora/RoboCup/">http://www.aass.oru.se/Agora/RoboCup/</a>
11	

<b>19. Tsinghua Hophaestus ( China )</b>	
<b>1</b>	Tsinghua University
<b>2</b>	6 members ( 5 students, 1 prof )
<b>3</b>	They started on studing this project in 2003. This is their first participation to competition.
<b>4</b>	Yixin Cai : Localization, Vision
<b>5</b>	Member said as follows. “We are studying the sources that we stale from other team, because we have no experiences yet. It is difficult to adjust old sources to new AIBO. Although we lost in this time, it was good chance for us to experience the international game.”
<b>6</b>	No Info
<b>7</b>	No Info
<b>8</b>	We cannot make it, cause of shortage of time.
<b>9</b>	To be The World Champion!!
<b>10</b>	No Info
<b>11</b>	

<b>20. Twaves ( Japan )</b>	
1	Tokai University
2	11 members ( 7 students, 1 assistant prof, 1 instructor, 2 technical staff )
3	They started on studying this project in 2004, Aug. They participated Kitakyusyu competition 2005. This time is their first participation to international competition.
4	Takae Hayashi ( under graduated students ) : Manager, Behavior
5	They don't steal the source from other team, and program perfectly originally. They are tackling from the mathematical perspective.
6	Tool for robot's behavior
7	Powerful head shoot
8	Cradle dance, Kazu dance ( Kazu : Japanese famous soccer player)
9	To be The World Champion!!!
10	<a href="http://www.okadanet.jp/twaves/">http://www.okadanet.jp/twaves/</a>
11	 <p>The logo for FC WAVES is displayed within a rectangular frame. It features the text 'FC WAVES' in a large, bold, blue font. Below this, the phrase 'Where AIBO teach us' is written in a smaller, red font. To the left of the text is a stylized illustration of a white robot (AIBO) and a black and white soccer ball. At the bottom right of the frame, the text 'TOKAI UNIVERSITY RoboCup Soccer Project' is written in a small, black font.</p>

<b>21. UChile1 ( Chile )</b>	
<b>1</b>	University of Chile
<b>2</b>	4 members ( 3 students, 1 prof )
<b>3</b>	They participated to RoboCup2003 Padua for the first time, and also RoboCup 2005 Osaka.
<b>4</b>	Paul Vallejos : He is making motion and helping vision
<b>5</b>	It seems that their walk is not good...
<b>6</b>	Localization
<b>7</b>	2 good kicks
<b>8</b>	Cute behavior like Chilean style, but not run.
<b>9</b>	Members said as fallows. "In Chile, the soccer is popular sport, so I wanna make for children, adult, everybody. Just fun!! "
<b>10</b>	<a href="http://www.fcfm.uchile.cl/boletin/2004/07/19/">http://www.fcfm.uchile.cl/boletin/2004/07/19/</a>
<b>11</b>	

<b>22. UPENNARIZERS ( U.S.A )</b>	
<b>1</b>	University of Pennsylvania, School of Engineeing and Applied Science
<b>2</b>	No Info
<b>3</b>	They participated in RoboCup1999 Stockholm, RoboCup2000 Melbourne, RoboCup2001 Seattle(3rd), RoboCup2002 Fukuoka, RoboCup2003 Padua(2nd),RoboCup2004 Lisbon(4th) and RoboCup2005 Osaka.
<b>4</b>	Daniel D. Lee ( Assistant Prof ) : Team Leader
<b>5</b>	No Info
<b>6</b>	Using Script, High Level Programming
<b>7</b>	No info
<b>8</b>	Nothing Special
<b>9</b>	In the main research, Machine Learning. To educate students
<b>10</b>	<a href="http://www.cis.upenn.edu/robocup/index.php">http://www.cis.upenn.edu/robocup/index.php</a> <a href="http://www.cis.upenn.edu/robocup/oldsite/index.html">http://www.cis.upenn.edu/robocup/oldsite/index.html</a>
<b>11</b>	<p style="text-align: center;">  </p> <p style="text-align: center;"> <b>UPENNALIZERS</b>  University of Pennsylvania  </p>

<b>23. UT Austin Villa ( U.S.A )</b>	
<b>1</b>	University of Texas at Austin
<b>2</b>	7 members
<b>3</b>	They participated in RoboCup2004 Lisbon(Qualifier) and RoboCup2005 Osaka.
<b>4</b>	Peter Stone (Motor System Engineer) : Team Leader
<b>5</b>	Their team name is a play on the name of a prominent English football club, Aston Villa.
<b>6</b>	No Info
<b>7</b>	Their Walking is very fast.
<b>8</b>	Not necessary for win.
<b>9</b>	Machine learning mortify agents.
<b>10</b>	<a href="http://www.cs.utexas.edu/users/AustinVilla/">http://www.cs.utexas.edu/users/AustinVilla/</a>
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<b>24. Wright Eagle ( China )</b>	
<b>1</b>	University of Science and Technology of China
<b>2</b>	7 or 8 members
<b>3</b>	They started in 2001. They participated in RoboCup2001 Seattle(Qualifier), RoboCup2002 Fukuoka(Qualifier), RoboCup2003 Padua(Qualifier),RoboCup2004 Lisbon and RoboCup2005 Osaka.
<b>4</b>	Dr. Xu Kai
<b>5</b>	It is the first Chinese team that ever entered the international RoboCup competitions and the first Chinese legged robot team. The team has continuously held positions within top 8 in both simulation and 4-legged leagues in RoboCup during the past three years and also got a runner-up in coach competition in RoboCup2001, Seattle.
<b>6</b>	Localization, Making Correct Behavior
<b>7</b>	Powerful shoot, Stable Walk
<b>8</b>	Gesture of waving hands
<b>9</b>	To be the best one in world competition
<b>10</b>	<a href="http://wrighteagle.org/en/robocup/index.php">http://wrighteagle.org/en/robocup/index.php</a>
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