

R.A.T.S.: Real-time Action Tracking System :

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Objectives

The intention and goal of the **software team** was to design a software package responsible for reading data from the break-beam system, using the data to calculate the height traveled by the athlete, and to display all relevant information to the user in a meaningful way. The software encompasses a number of design principles, from the technical design of calculating the height value, to the usability of the graphical interface

Needs Assessment

Information Problem:

The lack of accurate, objective, real time statistical information for judging and evaluating the performance of extreme athletes (skateboarders, snowboarders, etc.).

Methodology:

Literature Reviews

- Judges Manuals and Handbooks
- Action Sports Publications

Interviews and Consultations

- Interviewed a representative from Hoffman Bikes to discuss the reliability of heights calculated for a world record in a half-pipe.
- Consulted medical professionals to determine the limitations of the human visual system.

Action Sports Video Reviews

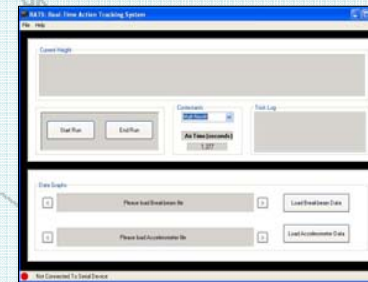
- Reviewed audio as well as video of action sports events.

User Needs:

- **Accuracy:** Judges **need** a tool to accurately measure height in real time.
- **Reliability:** Athletes **need** a tool that gives their skill justice.
- **Speed:** All parties **need** a tool to provide information quickly.

Development

- Determined key calculation:
 Height Equation: $height = (g \text{ (time in seconds)}^2) / 8$
 $g = \text{acceleration of gravity} = 9.8 \text{ meters/sec}^2$
- Developed Application Architecture Diagram
- In order to communicate with the break-beams, a class was implemented that allowed for serial port communication between the laptop and the analog input module.
- An implementation of an execution timer was essential for recording the total time taken for a person to enter and leave the air.
- A functional user interface needed to be developed in order to display the maximum height of a specific hit on a vert ramp.



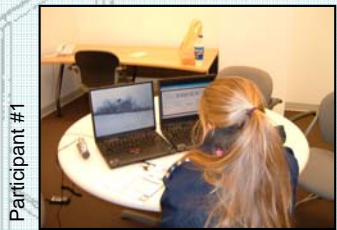
Visual Design of the User Interface



Software Architecture Diagram

User Evaluation

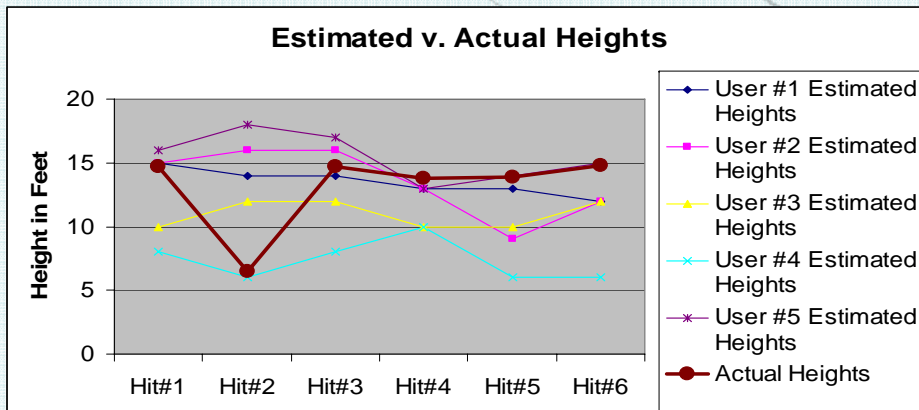
- Recruit qualified members of the action sports community.
- Create an effective evaluation tool.
- Test the validity and effectiveness of the evaluation tool by demonstrating the system.
- The tool will be shown to our users via a simulated system involving video clips.
- Issue evaluation questionnaire to users.
- Review user feedback and suggestions.
- Compile and assess data (See Graph).



Participant #1



Participant #2



Graph displays the results extracted from user evaluations (See User Evaluation)

Future Work

- Plan and implement improvements based on the user evaluations.
- Focus on displaying other types of statistical information: rotation, speed, etc..
- Develop software that would work directly with the accelerometers.

