A Leap for Mankind: Teaching Procedural Programming to the General Public

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Study Target / Focus / Purpose

Our research aims to address the ongoing need for more STEM professionals in the current workforce by encouraging a focused interest in information technology at an earlier age. Our goal targets students and participants of all ages that do not necessarily have a formal programming background.

This study is inspired by the various simple racing games found on gaming websites. Game controllers are traditionally used to interact with the games; however, instead of using a keyboard setup, we took a more creative approach and implemented the Leap Motion controller. The Leap Motion hand tracking controller will allow our players to interact with our game with motion controls. Moreover, we utilize ScratchX, a drag-and-drop programming language, to create the racing game. The application of these technologies will engage the general public in an interactive way.

Description of TAP program

The Technology Ambassadors Program (TAP) is an interactive class focused on service learning. TAP provides the opportunity to build a project using different technologies and collectively deliver it through conferences, student involvement, workshops, and outreach events. This study will analyze the feedback and results of these outreach activities.

Methods

Our goal is to introduce our audience to procedural programming through an interactive activity where participants can develop their own simple racing game. Participants will learn basic logical operators and statements, such as if/else and while loops. We will use block coding to help simplify the concepts and create more interest in IT for students. Through the interactive drag-and-drop architecture of Scratch, the students will learn how certain algorithms are adopted to create the logic behind a game. At the

end of the activity, we hope to ignite a strong curiosity for the computer sciences and demonstrate that everybody is capable of learning how to program. We want to encourage the students to become lifelong STEM learners and begin their STEM journey at an earlier age.

The two technologies used in this project are the Scratch programming language and Leap Motion. Leap motion is a computer hardware sensor device that supports hand and finger motions as inputs. We will use this technology to allow the audience to control their cars in an interactive way by using hand motions along with the leap motion controller Ultraleap Tracking. (n.d.).

Scratch is a drag-and-drop programming language developed by MIT, which aims to introduce children to programming and logical problem-solving in an interactive, easily digestible manner. Scratch also provides an online community where users can share interactive media such as stories, games, and animation with people from all over the world. Scratch is designed and maintained by the Lifelong Kindergarten group at the MIT Media Lab (Scratch, n.d.).

Tap Expo (Target Audience: GGC college students and faculty)

We will demonstrate a working game where participants can interact with the technologies at each of the stations. Our project members will give a short description of the project to any curious event attendees, as well as to answer any other technical questions that they may have.

Super Saturday Series (Target Audience: Middle School / High School Girls)

The Super Saturday Series will feature a demonstration of the working game where participants can interact with our team and our game, having the chance to choose and customize their experience from various tracks we developed. Our project members will give a short description of the project to any curious event attendees, as well as to answer any other technical questions that they may have.

Classroom (Target Audience: ITEC 2110 Students)

The classroom activity will feature an interactive learning activity which will last one hour. We will introduce ourselves and we will provide the pre-activity survey. Next, we will give a simple real-life example of a programming concept. Then, we will show our working race game, and then have students code their own basic racing game by following along with our instructions. After the students code and test their own games, we will summarize what they have learned and then they will have the opportunity to try the harder courses that we developed. The students will then complete the post-activity

survey and there will be an open discussion, where students can share what they have learned during the session.

Workshop Research Symposium and conference setup (Target Audience: General)

Demonstration of the working game where participants can interact with our team and our game, having the chance to choose and custom their experience from various tracks we developed. Our project members will give a short description of the project to any curious event attendees, as well as to answer any other technical questions that they may have.

We will measure the results and success of these activities by administering pre-activity and post-activity surveys. The surveys will incorporate basic questions about the programming content, which will let us gauge the participants' knowledge of basic programming concepts, both before and immediately after the activity.

Results

Once we conduct our workshops and demos, we will analyze the results from the previously mentioned surveys.

1. Tap Expo
2. Super Saturday Series
3. Classroom Workshops
4. Create Symposium at GGC
5. STARS Research Symposium at GGC
6. Atlanta Science Festival

Discussion and Conclusion

Our mission is to garner interest in basic programming skills via an interactive project based on ScratchX and Leap Motion. Our racing game showcases the importance of if-then statements and loops, taught in programming fundamental classes, without overwhelming the general audience- which does not require advanced programming knowledge. Through using interactive and simple teaching techniques that engage the participants, we aspire to also motivate our diverse audiences to learn more about the various opportunities in the field.

References

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Acknowledgements

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