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This document has been reviwed by the faculty advisors prior to its submission to NASA and verified that the document reflects the design used for the 2017 NASA Swarmthon Competition

Grambling State University (**GSU**) is a historically black university located in Northwestern Louisiana in the city of Grambling. The University was founded in 1901 and operated as an open admission university until 2007. Selective admissions requirements were fully implemented for the fall 2010 semester. The campus occupies 375 acres with 101 permanent structures. Grambling State University has an enrollment of 4,863 students, with 91% of the student body classified as Black non-Hispanic. The undergraduate enrollment is 3,583 students and the remaining students are at the graduate level. Eighty percent (80%) of the student body is classified as Louisiana residents. Many of Grambling's students are first generation college students. More than 85% of the student body receives financial aid. Grambling State University is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC).

The Department of Computer Science, Grambling State University conducts Robotics and Cybersecurity workshop during the month of June. The robotics program student groups include middle schools and high schools. During the year June 2015 the high schools students were attended for two week robotics workshop. In June 2016 we conducted one week workshop for middle school students. Ion 2016 summer robotics workshop, two teachers and seven students attended from 4 different middle schools. Three student instructors were trained to help the workshop attendees. These instructors demonstrate robotics actions during high school day and high school visits. The implementation includes – build robots, use ultrasonic sensors, line sensors, and light sensors. High school students complete most of the work since they have two week program. Middle school students complete ultrasonic, robot movements (programmed and joystick controlled) and light sensors. The students build robot using Vex Robotics kit and Flowel4 software (drag and drop components and programming). Sample code demonstrated by the students for various moments of robot are provided in the figures at the end of the report.

Outreach Activity Design

Every year our robotics student groups are involved to go to high schools and perform robot demonstration on '**High School Day'**. The 2016-17 academic year we have an opportunity to demonstrate in Fall 2016 and Spring 2017. More than 300 students from different high schools (20 high schools) were attended for these special high school days and showed lot of interest in robotics program and NASA Swarmathon program at Grambling State University. The Swarmathon group demonstrated the Vex robot actions to high school students and explained them the role of robots

in future technology. They further explained the importance of NASA Swarmathon program as part of computer science curriculum at Grambling State University.

The main objective of the outreach program is to introduce high school teachers and students to robotics program and role of robots in current technology. The program goals include:

- Building Robot, developing flow chart, converting flow chart into program, and drag and drop components are dynamic human activities in the Robot build and demo project.
- Promote Science, Technology, Engineering, and Mathematics (STEM) disciplines among youth and especially among urban youth; and
- High school teachers familiar with robot technology and will train the students in Robotics and Cyber security

Our high school visits include Grambling High School, Grambling Middle School, Carol High school, and Jonesboro High School. We encourage other high school students to participate in our workshop even though we do not get time to visit those schools. The parents and relatives visit our program and encourage their students to participate and learn the technology.

Professional Plans

Students are working on Robotics projects in groups. This helps to work in group projects. The best projects will be presented in Louisiana Academy of Sciences annual meeting every year. The students have better experience of building robots, programming robots and run simulation as part of NASA Swarmathon project. Robotics students have opportunity to get special training and work as student instructors during summer camp for high school students from various schools.

Educational Events

- The Swarmathon Robot groups present their work in High School day during Fall and spring.
- Good projects are presented in Grambling Undergraduate Research Symposium.
- Selected projects will be presented in Louisiana educational conferences every year.
- Selected projects also presented in Louisiana Academy of Sciences.

Current Status

NASA Swarmathon program helped us to start a course on Robotics as part of our curriculum. Seventeen students were enrolled in the semester to design competitive algorithm that will help them to enter into Physical competition. Among these participants, four students will be selected and trained to work as student instructors during our June 2017 Robotics workshop for high school students and teachers. The eight high school students and two teachers will be selected in April for summer 2017 Robotics workshop. The student groups will visit more high schools to promote the Robotics and NASA Swarmathon program at Grambling State University.

Future Plans of Robotics outreach Program

During the year 2017-18, at least 5 minority schools will be visited by individual robot groups to promote the Robot education and NASA Swarmathon project. If Grambling State University be one of the competitors in the physical competition during 2018, we will conduct Robotics class every semester that includes sophomores, juniors, and seniors. We group the students by combining sophomore, junior, and senior students and make them work as group for better learning and implementation.

The combination of sophomore, junior, and senior students will help them learn more and build better algorithm to win. Further, the groups will have internal competition before they enter into final level of competition. We plan to reach more high school students and by strengthening robotics in STEM field. Our experience of eight years in robotics workshop shows, 95% of students attended Robotics workshop entered in college mostly in STEM area at different universities. The Swarmathon project will give us more hands-on experience in modifying SWARM code and demonstrate simulations. Students will have better experience in modifying the code and run simulation experiments and teach high school students.