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| Pegasus%20-%20Black%20on%20White | | | | Department of Electrical Engineering & Computer Science, CS Division  College of Engineering & Computer Science  University of Central Florida | | | | | | |
| *Return Form to*: Dr. Mark Heinrich, heinrich@cs.ucf.edu | | | | | | |
| **COP 4934: Computer Science Senior Design** | | | | | | |
| **Proposed Project Description Form\*** | | | | | | | | | | |
| (Sponsors who are willing and able are asked to provide a Team Donation of $1500 or more for supplies and the running of the CS Senior Design Program) | | | | | | | | | | |
| Will support: Cannot support: | | | | | | | | | | |
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| Sponsoring Organization: | | | | | | Fitness Medical Systems, LLC | | | | |
|  | | | | | | | | | | |
| Mailing Address: | | | 3259 Progress Drive | | | | | | | |
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| Project Contact: | | Tom Mundy | | | | | | Position: | | CEO/Founder |
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| Contact Phone: | 321-298-5220 | | | | | | Fax: | | 813-388-4507 | |
|  | | | | | | | | | | |
| Contact E-mail: | tom@fitnessmedicalsystems.com | | | | | | | | | |
|  | | | | | | | | | | |
| Project Title *(working)*: | | | | | FMS PT Assessment Tool | | | | | |

*Please feel free to use as much space as needed for each of the sections below.*

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| **Background of Company/Organization**  (Provide a brief overview of the company/organization and the specific project location here)  Fitness Medical Systems, LLC., designs and produces next generation virtual technology to advance effectiveness in the science of physical therapy. Physical therapy for joint-replacement patients is a multi-billion dollar per year industry that recognizes three distinct inefficiencies. (1) Therapists must rely on patients to perform exercises at home accurately without supervision. (2) The current method and system used for collecting patient data is complex and outdated. (3) Interaction with the patient tends to be time-consuming and limits productivity.  FMS was started as a Venture Track project during my final semester at UCF’s FIEA Graduate program. There was limited interest from other members and faculty as the project was considered too serious for the interactive entertainment program. I did persuade a few members of the class to help with the design of an initial prototype using Unity and Kinect. This prototype has been shown to a number of investors and clinics, all of which have expressed interest. The main issue is one of reimbursement for the clinics. In other words, how will they bill use of the product? Billing is an issue that we have absolutely no control over at the moment as this would be a job for a lobbying firm and could take years to enact change in Medicare billing codes.  However, during the course of our discussions with clinics, including the Physical Therapy Department here at UCF, a variation of the core product could be implemented and funded very fast upon completion of a prototype. This variation would be a blue tooth enabled tablet/headset combination that would use voice commands and voice recognition in order to allow for therapists to do hands on patient evaluations while dictating directly into patient records. We will be working in conjunction with the Physical Therapy Department for assistance in testing and design recommendations based on a Physical Therapists average work day. The project location can be done remotely and on campus, there are no office requirements at this time. |
| **Statement and Scope of the Problem(s)**  (Provide the problem statement here; Please be as specific as possible to help us understand the scope of the problem, and thus the scope of the project, specifically the design content)  Physical Therapists (and doctors in general) are burdened with additional documentation requirements due to legislation regarding implementation of electronic medical records. On average, transferring notes about a patient into an electronic medical record system (EMR) adds one and a half hours to a therapists work day. This is a problem that extends to all facets of medicine, in all types of practices. We originally were working on a product specifically for physical therapy, and this is why we would like to continue our focus on that type of medicine initially. Essentially, an additional workday per therapist, per week, is needed to accurately input patient data into EMR systems. This is costing practices a lot of money, and decreasing the amount of patients a therapist can see per week, as well as billable hours.  It is our hopes, to develop a working prototype that allows a therapist to get audio cues through a blue tooth headset device, and then be able to speak responses and have those responses added directly to patient EMR files. Some of the challenges will be getting accuracy of the spoken words regardless of therapist accent, making the audio prompts and responses intuitive, insuring the security of the patient data, and making the code base flexible enough to customize features based on individual clinic requirements. |
| **Overall Project Goal(s)**  (Describe the overall goals of the project in this space) |
| The project goal is to have a working prototype that can be demonstrated with a high degree of accuracy to the Physical Therapy Department and other physical therapy clinics. This prototype would show the ability of the software to accurately track the therapist’s voice, and to give assessment cues to the therapist based on a template that can be modified for clinic needs. The prototype will have a sync feature allowing the tablet device to pair with the headset, as well as upload patient data into the main clinic server. The code base should be expandable to allow for future development in other types of medical practices. This prototype should be of sufficient quality to allow for the acquisition of funding from investors. Obviously, gaining additional funding is paramount, and obviously the development team would certainly be guaranteed jobs based on the securing of funds. |
| **Project Objectives**  (Enter the project objectives that will help achieve the goals of the project; Please be as specific as possible) |
| Determine best language for programming, determine feasibility and what headset would be best, see if an .exe could be done for multiple OS systems such as PC, MAC, Android (google tablets etc.), determine palette and overall look, implement medical dictionary, maximize accuracy of voice recognition even with accents, determine whether audio cues are triggered sound files, or if synthetic speech would be better, insure intuitive nature of the overall project so that learning curve is minimized, ease of exporting and syncing data to EMR systems, Make prototype expandable from a code base so that when funding occurs development can continue, not start over. There are a number of documents I have from the Physical Therapy Department which can be used for the basis of the prototype. I can also supply the Unity code if that is deemed necessary for the patient data. |
| **Expected Project Deliverables**  (Enter the expected project deliverables including, if possible, proposed project tasks; Please be as specific as possible)  In a nutshell, at the end of this project a therapist should be able to turn on a tablet, start the application, immediately pair with the headset, and then be able to respond to audio cues that will guide the therapist through a complete (if possible) Physical therapy assessment. The therapist will hear a cue and speak back the answer or information pertinent to that cue. The spoken responses should be accurate and immediately save after each entry without further response from the therapist. Upon completion of the assessment, the therapist will be able to easily upload or sync to the clinic EMR system and have all data transferred to the EMR system without much additional input from the therapist. |
| **Desired Core Competencies and Experience of Team**  (Please list the desired competencies/experience/knowledge needed by the project team members that you feel will facilitate successful project execution; Examples: specific programming language experience, familiarity or expertise in certain web technologies, databases, mobile SDKs, prior classes in certain subject areas, a love of computational complexity and efficient algorithms etc.) |
| Competence in C languages, some experience with UNITY would be helpful. Database and Mobile experience are pluses. It is more important to me to have motivated self-starters that can take direction. There will be certain parameters of the project that remain unknown at this juncture and problem solving skills will be crucial. This is definitely a think outside of the box project, but could segway into a full time position very easily if the project is successful. Any type of graphic ability is also a plus. I want a team that can play well together and really want to work on a project like this. I also want a team that is not afraid to comment in their code and comments often. I want clean code, not tricky code. This is the foundation of a much larger project and needs to be treated as such. Innovation is great, just add comments to explain what you are doing. |
| **Other Special Considerations and Project Requirements**  (Please provide any special circumstances, constraints, and requirements needed by the project team members; **Examples**:   * University participants must be US Citizens or Permanent Residents, * All work is to be performed off-campus at a specific site, * *Interdisciplinary project*: You would like to see CS students teamed with engineering students from one or more of: Computer Engineering, Electrical Engineering, Mechanical Engineering, Industrial Engineering, Civil and Environmental Engineering (please specify) * All team members and the professor must submit to background checks, * All team members and the professor must sign non-disclosure agreements |
| Non-Disclosure is mandatory.  Paring with a Computer Engineering Student or two would be preferable.  Work can be done on campus, it is possible to set up a server that would utilize perforce or similar depending on the preference of the team. |
| **Project Mentor(s), if different than who is listed above**  (Please provide the contact information and title/position for the project mentor(s), who will advise the student team) |

*\*IMPORTANT NOTE: Proposed projects may not be chosen by student groups. In any one semester the number of potential industry-sponsored, faculty-proposed, or student-funded projects may exceed the number of student teams. If this project proposal is approved by Dr. Heinrich as a potential CS Senior Design project, you or an appropriate representative will be asked to come to class and give a 15-minute project pitch to the students. Keep in mind this is your chance to convince the students why they should pick your proposed project. Think about what is in it for them, what technologies they will get exposed to, what are the broader, enduring, and social impacts of the work, etc. If your project is chosen, you will be notified typically by the 4th week of the semester. If your project is not chosen, you will be notified in the same timeframe and if it makes sense for your timeline, we would love to offer the same project in the next semester.*