**Multidisciplinary Senior Design**

**Project Readiness Package**

Prepared by Harold Paschal on July 24, 2020

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| **Project Title** | Automated Player Piano 5 |
| **Project Number** | P21363 |
| **Primary Customer** | Ron Dufort; Ron.Dufort@xerox.com |
| **Sponsor** |  |
| **Faculty Champion** | [Optional, assigned by MSD] |
| **Other Support** | [As applicable] |
| **Project Guide** | [Assigned by MSD] |
| **IP Considerations (must pick one)** | Client requires result to be placed in the public domain |

**Project Information**

**Overview**

The RIT player piano project has been a multi-year effort to develop a computer controlled system that that can be installed in a standard piano. The goals have been to install the system without permanently altering the piano nor inhibiting the ability to play it normally but provide the ability to play songs with one hand while the system “plays” the other hand. There has been a continuing effort to increase the control the human player has over the songs that can be played and their tempo, and loudness. The usefulness of the system as a teaching device has also been pursued.

The goals of this project are: complete assembly and test that was interrupted by pandemic, incorporate foot pedals in playback, extend midi file capabilities.

Previous iterations:

<https://edge.rit.edu/edge/P17363/public/Home>

<https://edge.rit.edu/edge/P18363/public/Home>

<https://edge.rit.edu/edge/P19363/public/Home>

<https://wiki.rit.edu/display/P20363/P20363+Home>

**Preliminary Customer Requirements (CR)**

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| --- | --- |
| REQUIREMENT | COMMENT |
| create midi files for playing on the piano | must be simple process |
| record one-handed playing | playback as a midi file |
| identify interaction of software and hardware | develop timing diagram |
| incorporate foot pedals in playback |  |
| develop models of possible playback styles |  |
| perform complete composition | use entire keyboard |
| developing volume model | interpreting midi files |
| complete assembly and test | due to pandemic interruption |

**Constraints**

Project must build on previous iterations of the player piano projects.

**Project Deliverables**

Minimum requirements:

* All design documents (e.g., concepts, analysis, detailed drawings/schematics, BOM, test results)
* Working prototype
* Technical paper
* Poster
* All teams finishing during the spring term are expected to participate in ImagineRIT

Additional required deliverables, if needed:

* (e.g., submission to a particular conference or competition, invention disclosure, on-site installation, video clip of final project/lightning talk video)

**Budget Information**

TBD

**Intellectual Property**

Client requires result to be placed in the public domain

**U.S. Citizenship**

Not required.

**Travel Opportunities**

None anticipated.

**Project Resources**

**Anticipated Student Staffing by Discipline**

Please provide a brief explanation of the expected activities for each required discipline. This information helps us assign appropriate staffing. If you have identified team members already, list their names here. “Other” includes students from any department on campus besides those explicitly listed (e.g., Design, Business, Software Engineering, Civil Engineering Technology).

|  |  |
| --- | --- |
| **Department** | **Expected Activities** |
| Biomedical Engineering |  |
| Computer Engineering | embedded software, GUI, file handling |
| Electrical Engineering | circuit design, digital design, microprocessor design, electromechanical design |
| Industrial & Systems Engineering |  |
| Mechanical Engineering | structure design, linkage design, electromechanical design |
| Other |  |

**Required Resources**

Describe the resources necessary for successful project completion. When the resource is secured, have the responsible person initial and date to acknowledge that they are aware and agree. We assume that all teams with ME/ISE students will have access to the ME Machine Shop and all teams with EE students will have access to the EE Senior Design Lab, so it is not necessary to list these. Limit this list to specialized expertise, space, equipment, and materials.

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| **Faculty** | [List individuals and their area of expertise (people who can provide specialized knowledge unique to your project, e.g., faculty you will need to consult for more than a basic technical question during office hours)] |
| **Environment** | [e.g., a specific lab with specialized equipment/facilities, space for very large or oily/greasy projects, space for projects that generate airborne debris or hazardous gases, specific electrical requirements such as 3-phase power] |
| **Equipment** | [Specific computing, test, measurement, or construction equipment that the team will need to borrow, e.g., CMM, SEM] |
| **Materials** | [List materials that will be consumed during the project, e.g., test samples from customer, specialized raw material for construction, chemicals that must be purchased and stored] |
| **Other** |  |