Application of CMMI process in the project:

SRHC – Smart Robot House Cleaner

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| CMMI level | Project area | Specific objective | Specific rules | Description of rule application in the project to date, possible improvements, references to other documents |
| 1 | Requirements initialization |  |  | This project’s intent is to design and develop software and hardware  for autonomous robot whose purpose is to clean and maintain the  floors in houses instead of people. Also, it will be able to clean other  surfaces above the floor level, maintain its own garbage bag, and  go to the charging station when needed. |
|  | ments  Management | Managing requirements | Obtain requirements agreement | It’s needed to generalize customer requirements and our ideas. (uniformly) |
| Obtain commitment towards requirements | Enabling all functionalities of the SRHC and website. |
| Managing requirements changes | Notice timely, and react on time to all changes of conditions and environment. |
| Maintain bidirectional traceability of requirements | Enable requirement traceability between prototype product and final work products. |
| Ensure Alignment Between Project Work and Requirements | It’s needed to notice all contradictions timely, with the least possible cost, and resolve them. |
| Standardize managing process | Establish organizational rules | Design a set of guidelines and instructions so that managing is as good as possible. |
| Plan the processes | Write a detailed plan in ProjectLibre. |
| Ensure resources | Ensure work places and equipment for employees. |
| Assign responsibilities | Decentralize tasks on all team members. |
| Train staff | Organize seminars to perfect the knowledge that will be used in system realization. |
| Manage configurations | Organize meetings after every phase to ensure agreement and manage the consistency of configurations. |
| Identify and include valuable participants | Make reports and needed documentation for all stakeholders so that they see the progress.f |
| Process control and monitoring | Introduce mini test on meetings after end of each phase of project to determine if all requirements for that phase are met. |
| Objectively evaluate ideas | Consider ideas of all stakeholders, objectively and unbiased. |
| Perform a status revision with higher level management | Realize financial inspection and checkup of state of resources, as well as the flow of system development. |
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| Project Planning | Establish estimates | Define project domain | Project will be defined on a global level. |
| Define estimates of working products and tasks | Determine the evaluation criteria of all artifacts created in previous phases |
| Define the project’s lifespan | Lifespan of the project is while it is profitable and useful, evaluated at 15 |

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|  |  |  |  | years, and more with added improvements. |
| Define evaluation of the necessary effort and price | Defined in conceptual solution. |
| Develop a project plan | Consolidate budget and schedule | Budget that is defined in conceptual solution needs to be distributed on all phases and teams. |
| Identify project risks | Risk of oversaturation, cost of goods |
| Data management plan | Collected data are delivered to data manager. |
| Project resource plan | Create a call center with customer support operators that will be available 24/6, as well as needed space, resources and conditions for the staff. |
| Plan for needed knowledge and skills | Knowledge and skills of a candidate are determined whilst interviewing. |
| Participation plan | Division of roles. |
| Determine project plan | Based on conceptual solution, the project plan is written with more detail. |
| Obtain a commitment to the plan | Carry out a revision of project’s plan | Include in the new version of project plan every idea that is accepted. |
| Reconcile work activities and available resources | Ensure maximal use of all available resources and arrange them chronologically by needs of all teams. |
| Outline the obligations prescribed by the plan | Strictly adhere to the defined project plan in order to avoid defects. |
| Project Monitoring and Control | Monitor the Project Against the Plan | Monitor Project Planning Parameters | Localize the changes of project plan, for the sake of its improvement. |
| Monitor Commitments | In ProjectLibre, monitor all activities of project participants. |
| Monitor Project Risks | Monitor all risks and document them. |
| Monitor Data Management | Monitor if database is in a consistent state and if all data is valid. |
| Monitor Stakeholder Involvement | In ProjectLibre, also monitor activities of stakeholders. |
| Conduct Progress Reviews | Hold meetings after the completed model to exchange impressions and to identify potential changes. |
| Conduct Milestone Reviews | At the turning points, document all revisions. |
| Manage Corrective Action to Closure | Analyze Issues | All obstacles in the development of the system should be immediately reported to the supervisor. |
| Take Corrective Action | In the shortest possible time, correct the obstacles found above. |
| Manage Corrective Actions | Document those corrections. |
| Configuration Management | Establish Baselines | Identify Configuration Items | Establish a type of system development. In this case incremental. |
| Establish a Configuration Management System | Name a person to be a coordinator, to supervise all teams, work,  and development. |
| Create or Release Baselines | Test the modules as soon as possible. |
| Track and Control Changes | Track Change Requests | Coordinator should notify team leaders about the changes in other  teams. |
| Control Configuration Items | Coordinator will keep track everything in documentation. |
| Establish Integrity | Establish Configuration Management Records | Provide the necessary resources. |
| Perform Configuration Audits | Estimate system configuration and record it in documentation that will be later delivered to team leaders. |

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|  | Supplier Agreement  Management | Establish Supplier Agreements | Determine Acquisition Type | Acquire hardware components needed for the prototype. |
| Select Suppliers | Find the best sellers and deals for all needed components. |
| Establish Supplier Agreements | Make a legal obligation with the selected suppliers, including reduced prices for buying in bulk later. |
| Satisfy Supplier Agreements | Execute the Supplier Agreement | Send a team of legal entities that will draft contracts for both parties. |
| Accept the Acquired Product | Verify that the acquired products satisfy their requirements. |
| Ensure Transition of Products | Transport is supervised by the supplier. |
| Measurement and  Analysis | Align Measurement and Analysis Activities | Establish Measurement Objectives | Prioritize information needs and objectives. |
| Specify Measures | Define exact standards for measures and analysis. |
| Specify Data Collection and Storage Procedures | Create data collection mechanisms. Data will be stored in a database. |
| Specify Analysis Procedures | Design ways of measuring and analyzing the project. |
| Provide Measurement Results | Obtain Measurement Data | Document all results and save them In appropriate DB tables |
| Analyze Measurement Data | Compare results with standards and measures and verify. |
| Store Data and Results | In the database. |
| Communicate Results | Results are understandable, and easily interpretable. |
| Process and Product  Quality Assurance | Objectively Evaluate Processes and Work Products | Objectively Evaluate Processes | All processes must comply with the prescribed standards. |
| Objectively Evaluate Work Products | Evaluate selected work products at selected times. |
| Provide Objective Insight | Communicate and Resolve Noncompliance Issues | Identify the risks and means how to resolve them. |
| Establish Records | Revise the status and history of quality assurance activities as necessary. |
| 3 | Risk Management | Prepare for Risk Management | Determine Risk Sources and Categories | Source of risk is Uncertain or inadequate supplier capability. |
| Define Risk Parameters | The most important parameter is the ratio of supply and demand of  components. |
| Establish a Risk Management Strategy | Ensure resources beforehand by making a contract with suppliers. |
| Identify and Analyze Risks | Identify Risks | Not enough resources to meet the demand and keep growing. |
| Evaluate, Categorize, and Prioritize Risks | Physical components are essential for manufacturing the product. |
| Mitigate Risks | Develop Risk Mitigation Plans | Making alternative products using alternative components. |
| Implement Risk Mitigation Plans | Implemented by tracking resources and alternatives. |

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|  | Product Integration | Prepare for Product Integration | Establish an Integration Strategy | Set a deadline for integrating all modules into one, and ensure the quality of integrated module. |
| Establish the Product Integration Environment | Provide a workshop and testbed. |
| Establish Product Integration Procedures and Criteria | Documentation of each module as a part of integration process. |
| Ensure Interface Compatibility | Review Interface Descriptions for Completeness | If the initial requirements are changed, update all out of date interfaces. |
| Manage Interfaces | Stick to the system design specification. |
| Assemble Product Components and Deliver the Product | Confirm Readiness of Product Components for Integration | Perform unit tests before integration. |
| Assemble Product Components | Execute the integration process. |
| Evaluate Assembled Product Components | Carry out thorough integration tests. |
| Package and Deliver the Product or Product Component | Only done when the newly finished product is obtained, or in the case of software update for existing products. |
|  | Verification | Prepare for Verification | Select Work Products for Verification | Integrated system and initial project plan. |
| Establish the Verification Environment | Provide the resources necessary for the verification process. |
| Establish Verification Procedures and Criteria | Verify that the resulting system complies with the requirements of the initially defined plan. |
| Perform Peer Reviews | Prepare for Peer Reviews | Assemble a team for this phase. |
| Conduct Peer Reviews | That team needs to evaluate the developed system. |
| Analyze Peer Review Data | Analyze those evaluations and draw conclusions. |
| Verify Selected Work Products | Perform Verification | Conduct planned verification. |
| Analyze Verification Results | Document all noticed irregularities in verification and envision possible corrections. |
|  | Validation | Prepare for Validation | Select Products for Validation | Integrated system and initial customer expectations. |
| Establish the Validation Environment | Provide the resources necessary for the validation process. |
| Establish Validation Procedures and Criteria | Verify that the resulting system complies with the requirements of the initial customer expectations. |
| Validate Product or Product Components | Perform Validation | Conduct planned validation. |
| Analyze Validation Results | Document all noticed irregularities in validation and envision possible corrections. |
|  | Organizational Training | Establish an Organizational Training Capability | Establish Strategic Training Needs | If needed, provide additional training for a given team member. |
| Determine Which Training Needs Are the Responsibility of the Organization | Correct use of the product must be ensured. Indirect training for customers is needed for their best use of the product. |
| Establish an Organizational Training Tactical Plan | Team members will undergo specialized courses. Customers will have indirect training in the form of video tutorials and booklets. |
| Establish a Training Capability | Find workshops or online courses. |
| Provide Training | Deliver Training | Those people will be able to train new employees. |

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|  |  |  | Establish Training Records | Document training efforts and award employee progress. |
| Assess Training Effectiveness | Determine the attendance and productivity of training |
|  | Organizational Process Definition | Establish Organizational Process Assets | Establish Standard Processes | Assign participants to teams and select team leaders. |
| Establish Lifecycle Model Descriptions | Select lifecycle models based on the needs of projects |
| Establish Tailoring Criteria and Guidelines | Adapting the process to a new product line or work environment. |
| Establish the Organization’s Measurement Repository | Ensure the required quality of the system and make comparisons during development. |
| Establish the Organization’s Process Asset Library |  |
|  | Organizational Process Focus | Determine Process Improvement  Opportunities | Establish Organizational Process Needs | Define the look and feel of the end product. |
| Appraise the Organization’s Processes | Establish a strategy to improve the system. |
| Identify the Organization’s Process Improvements | Document each idea as it is considered correct and approved by the rest of the team. |
| Plan and Implement Process Actions | Establish Process Action Plans | A detailed plan for executing and validating actions for improvement needs to be made. |
| Implement Process Action Plans | Conduct said plan |
| Use improvements and favorable actions | Apply found possible improvements.  vements. |
| Incorporate Experiences into Organizational Process Assets | Every experience gained is shared with other teams so that they can also get the benefit and avoid the same mistakes. |
|  | Integrated Project Management | Use the Project’s Defined Process | Establish the Project’s Defined Process | Coordinator will inspect all teams. |
| Use Organizational Process Assets for Planning Project Activities | Send team leaders to exhibit team progress in team meetings. |
| Integrate Plans | Form a structured set of all plans. |
| Manage the Project Using Integrated Plans | Stick to the defined plan. |
| Contribute to Organizational Process Assets |  |
| Coordinate and Collaborate with Relevant Stakeholders | Manage Stakeholder Involvement | Keep documentation of all stakeholders. |
| Manage Dependencies | Provide advertising depending on the size of the sponsorship. |
| Resolve Coordination Issues | If there are problems in coordination then identify the causes and  remove them in a timely manner. |
|  | Decision Analysis and Resolution | Evaluate Alternatives | Establish Guidelines for Decision Analysis | Determine ways to change decisions in relation to changes in system development. |
| Establish Evaluation Criteria | Criterion is productivity of the product and customer satisfaction. |
| Identify Alternative Solutions | Model with different components but similar functionalities. |
| Select Evaluation Methods | The assessment is based on a sample of people, potential users. |
| Evaluate Alternatives Solutions | Perform system evaluation. |
| Select Solutions | Determine which solution is best for improving the old solution. |

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|  | Organizational  integration Environment | People management | Establish balancing mechanisms | Set the responsibility that each team leader has to respect. |
| Select processes | Develop strategies to motivate team members. |
| Establish process performance measures | Introduce sanctions for non-compliance with plans and agreements. |
| 4 | Organizational Process Performance | Establish Performance Baselines and Models | Select Processes | Select a set of processes and subprocesses to which to apply techniques. |
| Establish process performance base lines | Determine baselines of selected organization’s process performance |
| Establish process performance models | Establish the process-performance models based on the organization’s set of standard processes and the organization’s process-performance baselines. |
| Establish Quality and Process-Performance Objectives | Define the organization’s quantitative objectives for quality and process performance. |
| Establish Process-Performance Measures | Select measures that provide appropriate insight into the organization’s quality and process performance |
| Quantitative Project Management | Prepare for Quantitative Management | Establish the Project’s Objectives | Write a document to establish and maintain the project’s quality and process performance objectives. |
| Compose the Defined Process | Using statistical and other quantitative techniques, create a defined process that enables the project to achieve its quality and process performance objectives. |
| Select Subprocesses and Attributes | Select subprocesses and attributes critical to evaluating performance. |
| Select Measures and Analytic Techniques | Identify common measures from the organizational process assets that support quantitative management. |
| Quantitatively Manage the Project | Monitor the Performance of Selected Subprocesses |  |
| Manage Project Performance |  |
| Determine the cause of defects |  |
| Perform Root Cause Analysis |  |
| 5 | Causal Analysis and  Resolution | Determine Causes of Defects | Select Outcomes for Analysis | Determine which outcomes to analyze further and formally define the scope of the analysis. |
| Analyze Causes | Analyze what led to those defects, and if that cause is repeated thoroughly change those functionalities. |
| Address Causes of Selected Outcomes | Implement Action Proposals | Analyze the action proposals and determine their priorities. Then  select action proposals to be implemented. |
| Evaluate the Effect of Implemented Actions | Measure and analyze the change in process performance of the project’s affected processes or subprocesses. |
| Record Causal Analysis Data | Document done work and analysis data. |
| Organizational Performance Management | Manage Business Performance | Analyze Process Performance Data | Perform a thorough analysis on gathered process performance data. |
| Identify Potential Areas for Improvement | Identify potential improvement areas based on the analysis of process performance shortfalls, their documentation, and apply them. |
| Maintain Business Objectives | Maintain business objectives based on an understanding of business strategies and actual performance results. |
| Select Improvements | Elicit Suggested Improvements | Collect all potential improvements to the system and pass it on to the proper team. |
| Analyze Suggested Improvements | The corresponding team will analyze performance suggestions, how much will the requirements change, and how much will it help improve the system. |
|  | Validate Improvements | Establish whether the user's request changes significantly compared to the initial one. |
| Select and Implement Improvements for Deployment | Choose which ideas will be realized and distributed to the teams that will do this. |
|  |  | Deploy Improvements | Plan the Deployment | Plan a newly obtained system with all improvements, and prepare  it for deployment. |
| Manage the Deployment | For all improvements, it is necessary to keep proper records in the  form of documentation. |
| Evaluate Improvement Effects | Assess how much these improvements have contributed to the  system. |

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|  |  |  | razmeštanje |  | i obaviti. |
| Sprovesti poboljšanja | Planirati razmeštanje |  | Isplanirati novodobijeni sistem sa svim poboljšanjima i unapređenjima, i  takav pripremiti za isporuku. |
| Upravljati razmeštanjem |  | Za sva poboljšanja potrebno je voditi odgovarajuću evidenciju u vidu  dokumentacije. |
| Proceniti efekte poboljšanja |  | Proceniti koliko su ova poboljšanja doprinela sistemu. |