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Introduction

This specification document is for a system that assist the program committee chair and the members in the process of inviting the authors of exemplary scientific papers to present at an upcoming scientific conference. This system will be referred to as the “Conference Submission System”.

The purpose of this document is to cover the requirements and quality attributes of the Conference Submission System that is intended to replace the current system which involved an excessive amount of manual work. The functional requirements which have been identified and separated into user tasks, which is covered in the task and support. An overview of the domain model has been provided, visualising the system in relation to the actors and entities. Quality (non-functional) requirements have been included under the quality attributes heading. Finally, two example solutions have been provided to demonstrate how the system would work in the target environment.

Project Background

Overview

The Program Chair of an international research conference wants to improve the process of organising conferences. The current process of this system involves a great deal of manual work, and is prone to errors. The Program Chair has proposed a submission management system to improve the current workflow and automate some of his current work.

Domain Vocabulary

The following words have been defined to ensure that they are not misinterpreted throughout the rest of the document

Reviewer: Member of the program committee
Scientific Paper or Paper: The piece of work which is written by an author
Abstract: A brief overview of a scientific paper (abstract, author, general information, tags)
Author: A researcher who has written a scientific paper
PC Chair: An abbreviation for the the Program Chair
Valid Format: Document formats which are common and usable by all Committee members
Review: The review of a scientific paper by a reviewer, specifying any issues they have and rating it on it’s scientific relevance
Scientific Paper Feedback or Feedback: Feedback given to an author based on a composition of the reviews a scientific paper receives

Requirements

Functional Requirements

- Handling “unknown” electronic (and non-electronic) formats or restricting formats.
- All submissions of papers and reviews must be validated

Constraints

- Must have at least 3 reviews per paper

Assumptions

The following assumptions have been made about the “Conference Submission System” specified:

- Non-accepted paper authors will not be invited to present at the conferences
- Maximum of 300 papers submitted per conference
- 75% of submissions and reviews will occur in the 24 hours prior to the deadline.
- This system will be able to handle only one conference at a time
- The abstract needs to be submitted before the submission of the paper
- The Program Committee Chair was elected by the Program Committee Members
- There is only a single Program Committee Chair at any one time
- The Committee is comprised of experts from a wide range of fields
- A single paper can have multiple authors
- A single author may write multiple papers
- The Program Committee already exists and already has a Chair elected.
- No Committee members will be added after initial creation of the system.
- The maximum committee size of 50 (commonly between 30 and 40 members)
- Once an author has received their Feedback subsequent submissions of their amended paper will be resent to the same allocated committee members for re-reviewing. This process can happen a number of times before the final submission deadline.

Scope

The PC Chair would like a submission management system which automates some of the work which they are doing in the current system. The system must be able to receive submissions of scientific papers from authors, which will be bidded on and allocated to committee members. The committee members review each of the papers and provide a final grade on the quality of the paper. The reviews are collated and a final result is produced along with feedback, which is returned to the author. The new system must also allow withdrawing of papers at any time after submission, and reviews from committee members or scientific papers must be editable after submission. Finally, the system must reduce the amount of manual work the PC Chair has to undertake and reduce the occurrences of incomplete information being provided to the system.

Problem Domain

Pain Points

- Manual Work
- Primarily using Email
- Incomplete Information
    - Missing abstracts/keywords and conflict flags
    - Unknown file formats
- Late review submissions

Domain Entities

- Abstract
- Author
- Bids
- Committee Member
- Paper Feedback
- Program Chair
- Review
- Review Allocation
- Scientific Paper

Actors

- Author
- Committee Member
- Program Chair

List of tasks

1. Record committee members and PC Chair
2. Advertise the availability of paper submission
3. Submission of research paper and abstract
4. Distribute paper abstracts to all committee members
5. Bid submitted on paper to review
6. Allocate and distribute papers for reviews
7. Committee member reviews paper
8. Generate and distribute paper feedback
9. Re-submission of amended paper
10. Publish accepted papers
11. Invite to present at the conference
12. Withdraw submitted paper
13. Update review
14. Update author
15. Deallocate paper review

CRUD Check

Task \ Entity	Abstract	Author	Bids	Committee Member
Record committee members and PC Chair				C
Advertise the availability of paper submission				
Submission of research paper and abstract	C	C		
Distribute paper abstracts to all committee members	R			R
Bid submitted on paper to review	R		C	
Allocate and distribute papers for reviews			R	
Committee member reviews paper				
Generate and distribute paper feedback		R		
Re-submission of amended paper	U			
Publish accepted papers				
Invite to present at the conference		R		
Withdraw submitted paper	D	D		
Update review				
Missing?		U	UD	UD

Task \ Entity	Paper Feedback	Program Chair	Review	Review Allocation	Scientific Paper
Record committee members and PC Chair		*C*			
Advertise the availability of paper submission					
Submission of research paper and abstract					C
Distribute paper abstracts to all committee members		R			
Bid submitted on paper to review		R			
Allocate and distribute papers for reviews				C	R
Committee member reviews paper			*C*	*R*	
Generate and distribute paper feedback	C, R		R		
Re-submission of amended paper					U
Publish accepted papers					
Invite to present at the conference					
Withdraw submitted paper					D
Update review			*U*		
Missing?	*UD*	*UD*	*D*	*UD*	

The above CRUD check outlined some gaps in the task list and required some additional tasks for the missing parameters.Since there was no update for author, an ‘Update author’ task was added, and since there was no delete for review allocation, a ‘Deallocate Review’ task was added.

Other missing tasks from the CRUD check were justified as follows:

- It is assumed that the Committee and the PC Chair never change throughout a conference, therefore neither Committee and the PC Chair can be updated or deleted
- Updating and deleting bids is not required. If a Committee Member cannot review a paper they bid on and are assigned to review it, they can request to be unassigned
- Paper feedback cannot be updated or deleted as once it is sent to the author/s. However, subsequent feedbacks can be sent
- Reviews cannot be deleted once they have been submitted. However, additional reviews can be submitted
- Review allocations cannot be updated. However, they can be deleted and recreated.

Tasks & Support

Task 1 - Record committee members and PC Chair

Task:	Record committee members and PC Chair
Purpose:	To initialise the system with information on the people involved and their respective roles
Trigger/Precondition:	Setting up the system
Frequency:	Once, at the beginning
Critical:	Exceeds the maximum number of committee members
Sub tasks:	**Example solution:**
1. Record committee members details	The committee members are entered into the system as a reviewer
2. Label PC Chair as administrator	The PC Chair is entered into the system as admin
Variants:	

Task 2 - Advertise the availability of paper submission

Task:	Advertise the availability of paper submission
Purpose:	To notify the users that the system is available to accept submissions
Trigger/Precondition:	The system has been initialised, Committee members have been recorded
Frequency:	1-2 distributions by committee members
Critical:	
Sub tasks:	**Example solution:**
1. Distribute advertisement to committee members	Emails are sent out to all committee members
2. Committee members distribute	Committee members can forward the advertisement on to their contacts
Variants:	

Task 3 - Submission of research paper and abstract

Task:	Submission of research paper and abstract
Purpose:	To allow authors to submit their research papers to the system
Trigger/Precondition:	System has been initialised, Author has completed paper, Author has completed abstract
Frequency:	Approximately 300 paper submissions
Critical:	75% of paper submissions (~225) within the last 24 hours before submissions close
Sub tasks:	**Example solution:**
1. Author/s give their details	Author enters web page for system to enter their details into the fields provided
2. Author attaches abstract to the submission **Problem:** Abstract is in an unknown format	Author attaches their abstract and related documents into the abstract section of the submission form
3. Author attaches scientific paper to the submission paper **Problem:** Scientific paper is in an unknown format	Author attaches their scientific paper into the paper section of submission form
4. Author submits their submission	Author finishes filling out the submission form and clicks submit
Variants:	

Task 4 - Distribute paper abstracts to all committee members

Task:	Distribute paper abstracts to all committee members
Purpose:	Provide access for all committee members to abstracts so that they may review them individually
Trigger/Precondition:	Paper abstracts have been sent and collated
Frequency:	One mass distribution
Critical:	300 Abstracts provided to each committee member
Sub tasks:	**Example solution:**
1. Determine recipients	The PC Chair retrieves a list of all committee member details
2. Distribute abstracts	The PC Chair sends a mass message to all committee member reviewers
Variants:	

Task 5 - Bid submitted on paper to review

Task:	Bid submitted on paper to review
Purpose:	Committee members place bids on papers they want to review, so they have a choice to review the papers they are interested in
Trigger/Precondition:	All papers abstracts have been collected and distributed to all committee members
Frequency:	Zero or more bids per paper
Critical:	Every committee members places bids on every paper within the last hour before bids close
Sub tasks:	**Example solution:**
1. Reads paper abstract	A committee member reviewer finds and reads the abstracts of all scientific papers
2. Place a bid	A committee member reviewer finds a paper of interest and places a bid to review it
Variants:	
2a. Don’t place a bid	A committee member reviewer is not interested in the paper and does not place a bid on it

Task 6 - Allocate and distribute papers for reviews

Task:	Allocate and distribute papers for reviews
Purpose:	To distribute the scientific papers to committee members for review, based on the committee member's interest.
Trigger/Precondition:	Time for committee member bidding has expired
Frequency:	One mass distribution
Critical:	Every committee member is sent a copy of every paper
Sub tasks:	**Example solution:**
1. Tally review bids **Problem:** Paper has not enough bids **Problem:** Paper has no bids	The application processes all the bids into a list, highlighting any papers with insufficient reviewers
2. Assign committee members to review paper **Problem:** Reviewer works at the same institution as one of the authors	PC Chair is provided a list of the bids, highlighting any reviews which do not have the sufficient number of reviewers associated with it. The PC Chair can choose the reviewers if any issues occur
3. Distribute paper and review forms **Problem:** Paper has no reviewer	The PC Chair sends to a message to each committee member assigned to review it, with the paper and review forms attached
Variants:	

Task 7 - Committee member reviews paper

Task:	Committee member reviews paper
Purpose:	To assess the quality of the provided paper according to the opinion of the assigned committee member
Trigger/Precondition:	Paper has been allocated to a committee member
Frequency:	One review per committee member per paper
Critical:	Committee member reviews 75% of paper submissions (~225)
Sub tasks:	**Example solution:**
1. Retrieves paper for review	The committee member finds a message from the PC Chair with paper and review form they have been assigned for review
2. Reviews paper	The committee member reads the paper and fills out the review form
3. Assigns the paper a grade	The committee member gives the paper a letter grade depending on its accuracy and scientific quality
4. Returns complete review	The committee member finished the review and returns it to the PC Chair
Variants:	

Task 8 - Generate and distribute paper feedback

Task:	Generate and distribute paper feedback
Purpose:	To provide the author/s with the results and any feedback
Trigger/Precondition:	PC Chair has received all reviews for a paper
Frequency:	One per paper
Critical:	Compile 30-40 reviews for each paper
Sub tasks:	**Example solution:**
1. Gather reviews	The system groups all reviews per paper into a form for the PC Chair
2. Assess reviews	The system calculates the responses from the reviews and allocates them as either Accepted, Rejected or Discussion required
3. Compile feedback	The system collates all feedback from the paper's multiple reviews into one document
4. Sends the feedback and final result back to the author/s	The system sends an email to the author/s containing the final result and all feedback for the paper
5. Pass result triggers invite to present at the conference	The system stores information on the author/s who passed in a list of possible presenters
Variants:	
5a. Author with a fail is sent no further information	The author/s who failed are not added to the list to present

Task 9 - Submission of amended paper

Task:	Re-submission of amended paper
Purpose:	Allow authors to update their paper
Trigger/Precondition:	Author has submitted paper
Frequency:	Approximately 5 times per paper
Critical:	Multiple authors of the same paper try to edit the paper simultaneously. All authors try to edit papers simultaneously
Sub tasks:	**Example solution:**
1. Find author in system **Problem:** Author does not exist **Problem:** Author's name changed	The system determines if the author attempting to access a paper exists
2. Author updates their paper	The author inputs updated information into the system
3. Changes to the paper are stored	The system stores the amended paper
Variants:	

Task 10 - Publish accepted papers

Task:	Publish accepted papers
Purpose:	Publish the paper to the public
Trigger/Precondition:	Paper passed the review process
Frequency:	Once per conference
Critical:	All papers accepted
Sub tasks:	**Example solution:**
1. Retrieve accepted papers from system	The system collates all accepted papers into a document
2. Send accepted papers to publishing company	Collated document is sent by the PC Chair to the publishing company
Variants:	

Task 11 - Invite to present at the conference

Task:	Invite to present at the conference
Purpose:	Invite the authors who had their papers accepted to present at the conference
Trigger/Precondition:	Paper passed the reviewing process
Frequency:	Once for every author of a paper
Critical:	All papers accepted
Sub tasks:	**Example solution:**
1. Retrieve author name from accepted paper	System reads author name from accepted paper
2. Invitation sent to accepted author	Author is sent an email, inviting them to present at the upcoming conference
Variants:	

Task 12 - Withdraw submitted paper

Task:	Withdraw submitted paper
Purpose:	Author can withdraw their paper from the system at any time
Trigger/Precondition:	Author has submitted paper
Frequency:	0-10 times per conference
Critical:	All authors withdraw papers simultaneously
Sub tasks:	**Example solution:**
1. Find author in system	System searches for matching name
2. Author indicates paper to be removed	The author selects the paper to be removed from the system
3. Paper is removed from system	The system records that the paper has been removed
Variants:	

Task 13 - Update review

Task:	Update review
Purpose:	Allows committee member to update their review on a paper
Trigger/Precondition:	Review has been created by committee member
Frequency:	0-40 times per conference
Critical:	100% of reviews being updated simultaneously
Sub tasks:	**Example solution:**
1. Find committee member in system	System searches for matching name
2. Committee member updates review	The committee member modifies their review entry for a specific paper
3. Review changes are stored	The system records that changes have been made to a review
Variants:	

Task 14 - Update author

Task:	Update author
Purpose:	Allow the author to update their personal information
Trigger/Precondition:	Author is in the system
Frequency:	0-10 times per conference
Critical:	100% of authors attempting to change details in a single timeframe
Sub tasks:	**Example solution:**
1. Locate author in system	System searches for matching name
2. Author changes their information	Author inputs updated information
3. Changes to author details are stored	System saves updated information
Variants:	

Task 15 - Deallocate paper review

Task:	Deallocate paper review
Purpose:	In the event that there is an issue with a review allocation, be it conflict of interest or otherwise, the committee member will be deallocated from that paper for review
Trigger/Precondition:	A committee member is identified as being unfit to review a paper they were previously allocated
Frequency:	1-50 times per conference
Critical:	A controversial topic leads all reviewers to be asked to be deallocated from a paper at once
Sub tasks:	**Example solution:**
1. Committee member decides they are unfit to review their allocate paper and submit a request to be removed	Committee member reads a paper and realises it is from their student, they login to the online system and submit a request to be removed via an online form
2. Identify and validate the reasoning behind the request for deallocating **Problem:** The request is not valid reasoning to remove the reviewer	The PC Chair receives a notification via email of the request to be removed and logs into the online system and reads through the provided reason and determines the validity of the request
3. Remove the committee member from the list of those to review the paper	The PC Chair clicks the accept button on the online request which automatically deallocates the committee member
Variants:	
2b. The reasoning for the request is not valid	Committee member does not provide a valid reason to be deallocated from the review
3b. The request is declined	The PC Chair clicks the cancel button on the online request, leaving the system unchanged

Domain Model

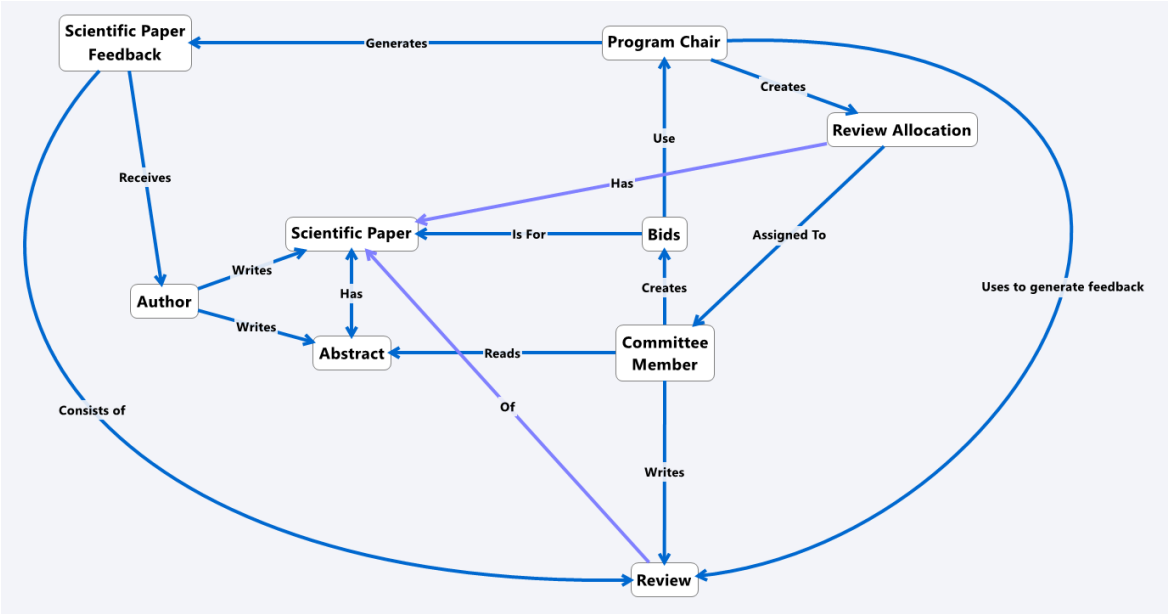

Figure 1: Domain model of the system

Quality Attributes

Usability

- The software will adhere to all the Swinsoft Consulting user-interface guidelines

Security

Securing the information within the system is important. Certain levels of protection will be in place to ensure that only the appropriate people have access to the appropriate information. This system must ensure confidentiality and prevent incomplete papers being release prematurely.

The following must be implemented into the system:

- The system must only support access by authorised users
    - Only authors can change information on their papers
    - Only reviewers are able to change their feedback
    - Only the PC Chair and the reviewer knows who wrote the review. All other members/everyone else will view them as anonymous
- Anyone without authority must not have access to this information

Correctness

Some pain points from the original system were caused by incomplete or incorrect data being sent to the PC Chair, which caused additional work. The new system must ensure correctness throughout the workflow.

The system must ensure the following are correct:

- Submissions for the bidding system
- Final grade of the paper
- Reviews of the papers

The system must support validating scientific papers for the following criteria:

- Has an associated abstract
- Has a list of keywords
- Is in a valid format

Reliability (Availability)

Since this system must be receiving information

- The system must be available for 98% of the time between the times of 8am-8pm and never be unavailable longer than 5 minutes.

Performance

The system must perform adequately to ensure that the information can be submitted, retrieved or modified in a timely manor.
The system must conform to the following -

- Support generation of initial review assignments and must be completed within 30 minutes
- Provide the collated review results within 30 minutes
- Successful submission of scientific papers, bids, reviews and feedback must be confirmed in under 6 seconds.

Possible Solutions

Possible Solution 1 - Website based system

A website based system would be implemented to fulfil most, if not all of the requirements for this system.

Once the system has been implemented and all committee members initialised into the system, the PC Chair advertise using multiple methods, using word of mouth (the committee advertises to anyone they know, including institutions, friends, co-workers, students, etc.) to let everyone know that submissions are open.

Authors of scientific papers are then advised to sign up to the system using a web page, where they are presented to sign up to the system using a username and password. Once a unique username and password has been entered, they are presented with a ‘profile page’, containing multiple fields to enter information on who they are, who contributed to the paper (either by username (someone who has already signed up to the web page), or by enabling another set of contact information for the other contributors), and contact information (phone number, email address, postal address) of each of the authors. Once their profile has been set up, they can submit an abstract of their paper (and related information), followed by a submission of their scientific paper in a known format. This information can be updated at any time by the author/s by signing back into the system using their username and password at a later date.

Once the submissions have closed (or during submissions if required), the PC Chair can look through the submissions for any which are incomplete (which is flagged by the system), to which the PC Chair can notify the author/s that they need to complete their submissions as soon as possible, otherwise they are ineligible to be reviewed. When all the submissions are in a satisfactory state, the PC Chair notifies the committee members that bidding can now take place.

Committee members are presented with a list of abstracts which can be filtered using the information which was provided by their author/s. The committee members read through the abstracts that they are interested in, then they can either make bids on the paper or flag them as unable to review. Once the bids have been submitted, the PC Chair is presented with an automated list of who should review which papers (based on expertise and/or fields of research of the committee member). The PC Chair then decides who should review each paper, ensuring that all papers are reviewed by at least three eligible committee members. The committee members are then notified of the papers which they are to review and are provided access to the papers through the system.

Once the committee members complete their reviews, they are entered into the system using a web page linked to that paper, which contains fields for entering their review (including any recommendations for paper modifications), and a grade is provided (using the A, B, C or D ranking system, or system preferred by the committee), finally submitting the review into the system. The committee repeats this step for each of the other papers allocated to them. These reviews can be edited by the committee member at any time before the final grade of that paper has been assigned. The Program Chair can also notify each member if the reviews need updating if there is any information missing.

The PC Chair is then presented with the review results and an automated recommendation using the combined grades of the reviews submitted by the committee. The PC Chair can then read into the reviews from each member for each paper, ensuring that the decision made by the system is correct or required to be looked into further. The PC Chair will do this for each paper, ensuring that any conflicting results will need to be resolved before the verdict. The PC Chair analyses each result and once satisfactory will provide a pass or fail for each paper.

When the results are finalised, the reviews (and feedback) will be anonymised and sent back to the author/s. Papers which have passed will be allowed to be updated through the author's profile page (for implementing any changes recommended by the reviewers). Invites will be sent to all authors of the passed papers to present at the conference. Failed papers will not be invited to present at the upcoming conference this time around.

Once papers have been updated and finalised, the author can mark their paper as "ready to be published", to which the paper can be checked by the committee, which is then published.

At any point during the process, the author/s are able to change information on their 'profile page', or remove their paper from the system.

Possible Solution 2 - Application Based System

An application based system would be implemented to fulfil the majority of system requirements.

When the system is required the records of all committee members and chair are recorded in the software.

The software then generates an advertisement in email format that is distributed to all committee members for them to forward on to their various contact circles.
Interested Researchers wishing to submit a paper to the system will find the application download link in the email advertisement. This application is then run on their devices (probably just computers).
The author is provided with two initial options:

- Submission of Paper by new author
- Submission of Paper by existing author

Once the cut-off date for submissions has been reached, a notification email is sent to all committee members informing them that the abstracts are available for viewing and bidding. The committee members are then able to access the abstracts by utilising the application also installed on their computers. They sign in to their account and as they read an abstract they are able to select the "bid" button which will indicate to the system that they wish to review that paper.

Once the deadline for bidding on papers is reached, the system will then automatically allocate papers to committee members and a notification is sent to the PC Chair for confirmation before the committee members are informed and allowed to start reviewing papers.

The committee member accesses the full paper in the same manner as the abstracts, by utilising the application. Members only have access to the papers that have been assigned to them. A review form is available for each paper. This form will contain all details required for a review, specifically the grading that is given to the paper and any written feedback.

Once the deadline for paper reviews has been reached, the system will automatically compile the reviews for each paper following a set of rules to match the grading systems to automatic passes, automatic fails and ones that require further discussion. Notification is then sent to the PC Chair to review the automatically generated results and the PC Chair will approve or alter the result as required.

Results that require further discussion are then distributed to either the entirety of the committee or a selection of different members in order to make a final decision.
Once the result of the review process has been approved, notification is sent to the author(s) of the paper to inform them of the decision and allowing them access to the written feedback for their paper. This is also accessed through the application on their machines.

Authors are then able to make edits to their papers based on the feedback provided. The edits are done in a similar fashion to initial submission of the papers. A history of the paper is kept so that edits do not completely overwrite the original submission.

After the review period concludes, all papers marked as accepted are distributed to the publishing company.

The authors of the accepted papers are all sent invitations to present at the corresponding conference. If an author has multiple accepted papers, the invitation indicates he or she is able to present for each paper.

Throughout the entire process the author is able to withdraw any paper they have submitted and they are able to update their own details in the system. Similarly committee members are able to update their reviews up until the finalisation of the feedback is completed. All of these functions are available through various windows available as part of the application.