1 Design testing

1.1 Test suite

	Added contexts	Deleted contexts	Added features	Deleted features
1	Device, DoNotDisturb, Phone, Context, InternetConnection		Notification, StyleCustomization, Name, DisplayConversation, Profile, Feature, Text, DeleteConversation, SendTime, DeliveryStatus, SendMessage, Picture, TypingIndicator, ContactName, Contact, AddContact, CreateGroupconversation, Customization, ReceiveMessage, Message, MuteDuration, EnableDisable, ReadStatus, Type, RemoveContact, CreateIndividualConversation, DeleteMessage, Conversation, ShowContactList	
2	Desktop, WiFi, Driving	DoNotDisturb, Phone	ContactPicture, ModifyName, AudioReading, OralReply	TypingIndicator, Customization, MuteDuration
3	Battery, High	Driving	Audio, UnreadableFile, ReadableFile, Previsualization, PhotoVideo	AudioReading, OralReply
4	AutoCorrect, DeviceLanguageSettings, Driving, Meeting		EnableDisableAutocorrect, AudioReading, MuteDuration, OralReply	
5		Battery, High		Audio, UnreadableFile, ReadableFile, Previsualization, PhotoVideo
6	Battery, DoNotDisturb	WiFi		ContactPicture
7	High	AutoCorrect, Driving	Audio, UnreadableFile, ReadableFile, PhotoVideo	EnableDisableAutocorrect, AudioReading, OralReply
8	AutoCorrect, Phone	Desktop, DoNotDisturb, Meeting	EnableDisableAutocorrect, TypingIndicator, Customization	UnreadableFile, ModifyName, MuteDuration
9	WiFi, DoNotDisturb, Driving, Meeting	AutoCorrect, DeviceLanguageSettings	ContactPicture, Previsualization, AudioReading, MuteDuration, OralReply	EnableDisableAutocorrect

1.2 Test scenarios

We assume that the user is connected to the Internet at all times, through WiFi or another type of connection.

1	The user is using the messenger app on his phone and enables the Do not disturb setting. He can therefore customize his notification sounds and the duration of the mute period for the Do not disturb feature. He can also see when one of his contacts is typing because the typing indicator is active. (see 1 for improvement)
2	The user switches off the Do not disturb setting, changes to his laptop and starts driving. The laptop is connected through WiFi to the Internet (through hotspot with the phone or the car). Since he is driving, he can reply orally to text messages (text-to-speech) and play text messages as audio files. The fact that the laptop is used enables him to modify the name of a conversation. The fact that he can view the picture of one of his contacts is also activated (unrealistic feature, correction in 2).
3	The user stops driving and plugs in the laptop to charge it. Since the laptop isn't running on limited resources (it is plugged in), The user can previsualize messages that aren't simple text messages and can send more advanced types of messages such as videos.
4	The user activates AutoCorrect in the language settings of his laptop and starts driving again while starting a meeting (unrealistic situation, see 3). He can now enable or disable auto-correct on the app, and set the mute duration for the notifications.
5	The user unplugs the laptop from its power source and therefore cannot previsualize or send advanced messages.
6	The Battery context is activated without the battery being high (inconsistent, see 4). The laptop disconnects from the WiFi, but can still send and receive messages (by sharing a connection with the phone of the user for example). Since it is not connected through WiFi any more, the user cannot view the picture of a contact (unrealistic, see 2).
7	The laptop is plugged in again, auto-correct is deactivated in the laptop settings and the user stops driving. The user now can use more advanced messages, but cannot use the audio reading and oral reply features any more and cannot set whether he wants auto-correct on the app or not.
8	The user switches to the phone and enables AutoCorrect in his phone settings after leaving his meeting and switching off the Do not disturb feature. Since he is using the phone now, he can customize the visuals of his conversations and view the typing indicator, but he cannot visualize unreadable files or modify the name of a conversation.
9	After disabling auto-correct in the phone settings, the user enables Do not disturb, starts driving and joins a meeting (unrealistic situation, see 3). The phone is connected to the WiFi of the car. Auto-correct is disabled on the app, the user can view a contact's picture, previsualize files and can use the "car" features such as oral reply and audio reading.

1.3 List of errors and ideas

1. **Do not disturb as a device setting**
   It makes more sense to replace the parent context *Device language settings* with *Device settings* because like the context *Auto-correct*, *Do not disturb* is a setting that is done in the device options and that enables more refined options in the app, such as setting the mute duration.

2. **Contact picture as a mandatory feature**
   It is somewhat illogical to only be able to view the picture of the contact you are communicating with under specific circumstances of the app usage. In the feature model, *Contact picture* is therefore mandatory and not optional any more.

3. **Driving and Meeting at the same time**
   Driving and being in a meeting at the same time seems far-fetched. The problem is corrected by adding an optional parent context called *Situation*, which holds both *Driving* and *Meeting* as alternative contexts.

4. **Battery as a mandatory parent feature instead of optional**
   Activating the *Battery* parent context without activating the *High* context doesn't activate any features and doesn't represent any "real-life" environment change.

5. **New feature ListConversation**
   This feature represents the visualization of the list of conversations that a user of the app can have. The addition to the feature model as it represents a class to be implemented.

2 Updated models

2.1 Lexicon

2.1.1 Features

Contact	A contact is a person that the user of the smart messenger can contact. It is part of a contact list that displays all the people the user can communicate with using this app.
Show contact list	The contact list (described in the previous feature) needs to be displayed if the user wishes to consult it.
Conversation	A conversation is a collection of messages that the user of the smart messenger shares with a contact or a group of contacts. It is stored in the form of a chat, where sent messages are displayed in chronological order with indications of which message was sent by whom.
Create individual conversation	The user starts a conversation with a single contact.
Create group conversation	Like for the individual conversation, the user can start a conversation by selecting a group of contacts to which he wishes to send a message.
Modify name	This applies to the name of a conversation and not the name of the contact in the case of an individual conversation. The user can modify the name of the conversation, which by default is the name of the contact in the case of an individual conversation and an enumeration of the names of the contacts in the case of a group conversation.
Display conversation	A conversation should be able to be displayed when the user wishes to read the messages in it.
Oral reply	An oral reply is a message dictated by the user to his device, and then sent as a text message. They are activated when the device is connected to the car.
Style customization	The conversation display screen can be visually customized with different themes, colors etc.
Typing indicator	When a contact in the conversation is typing, another user who has the conversation displayed can observe this through an indicator (special icon or text) with the name of the typing contact in the case of a group conversation.
Enable/disable	Notifications can be enabled or disabled separately for each conversation.

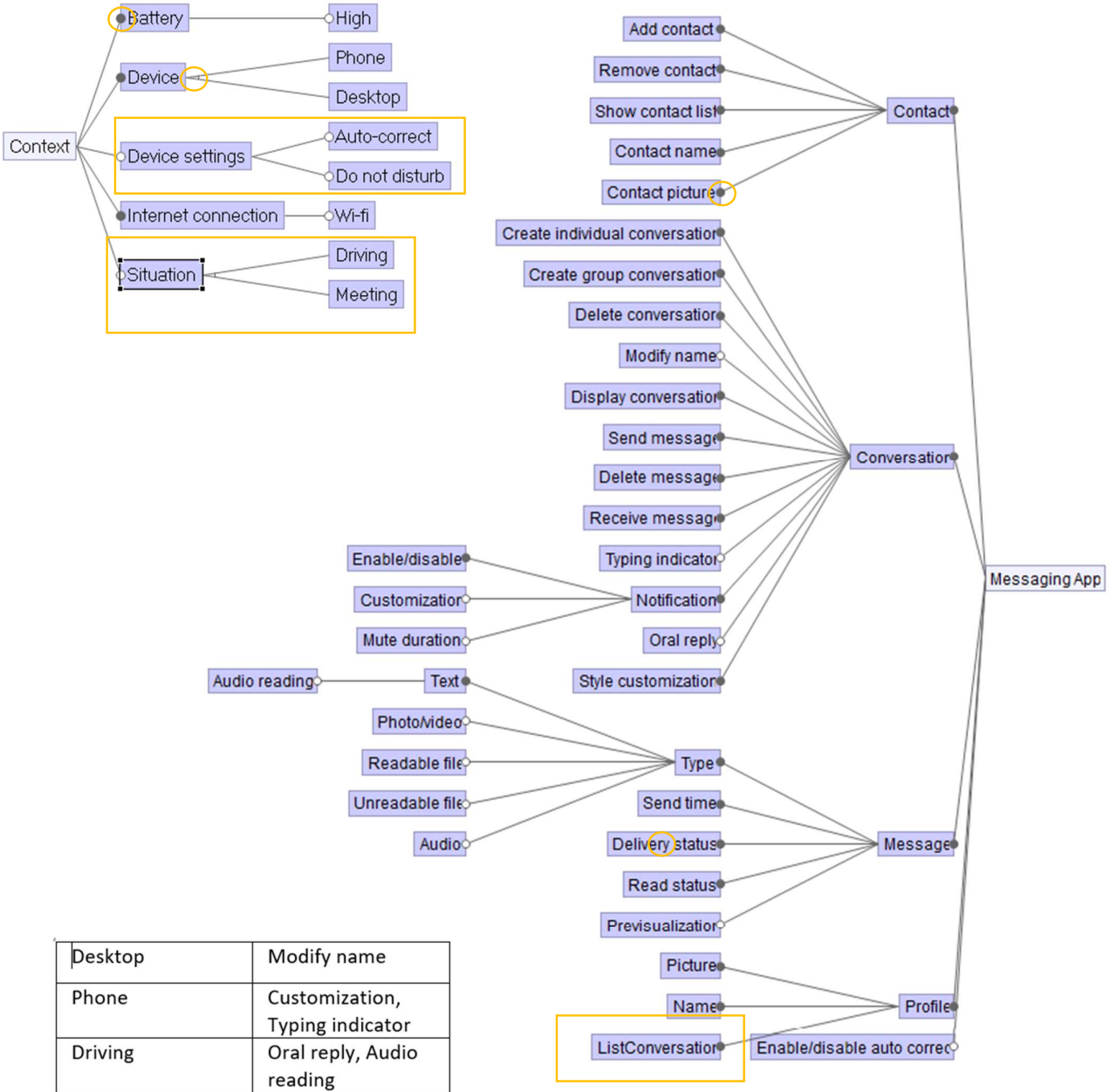
Customization	Notifications can be customized by the user for each conversation. An example of this is changing the notification sound.
Mute duration	A conversation can be temporarily or permanently muted, implying that no notifications will occur for that conversation for a specified amount of time.
Message	A message is any sendable content that a user has sent to another user or group of users.
Type	Messages can be of different types, such as simple text, photo, video or file attachment messages.
Audio reading	For simple test messages, it is possible for a device (such as a mobile phone or a connected speaker) to read out loud the message. This can be handy when the user is driving for example.
Readable file	A file attachment message that can be read and interpreted by the smart messenger, such as a simple txt file or a pdf file. This enables the file to be displayed and read by the user inside the conversation.
Unreadable file	The file attachment message cannot be visually interpreted by the smart messenger, and possibly also not by the user. Therefore only its download link is displayed in a conversation, and not its contents. Files of this type may include binary files for example. Given that mobile phones cannot support files of this type, they also cannot be sent on a mobile device.
Send time	Each message is characterized by the time at which it was sent.
Delivery status	A message can be in the outbox (written and confirmed but not sent), sent, or received.
Read status	This indicates whether or not the receiving contacts of a conversation have viewed a message.
Previsualization	This feature enables messages that require more resources such as battery and Internet to by directly displayed in the conversation and not just as a loading link. It could be disabled when the battery is low or the Internet connection is cellular, so that potentially large files like videos are not downloaded into the conversation by default.
Profile	This refers to the profile of the smart messenger user. Each contact in a contact list has a profile that is associated to that contact.
ListConversation	This feature embodies the representation of the list of conversations that as user can have.

2.1.2 Contexts

Battery	indicates the battery status of the device in use. If the device is a PC connected to a power outlet, it is considered to be high at all times.
Device	type of device used. Relevant subcontexts are Phone and Desktop.
Driving	In this context, the device is connected to the car. This is useful for some hands-off features.
Meeting	The device can detect if the user is in a meeting. This can be used to adapt the smart messenger to (temporarily) disable certain notifications.

Do not disturb	This context refers to a mode that user can enable on his device in the device settings. This setting is detected by the smart messenger and can be used to alter notification behaviour.
Device settings	The smart messenger takes on the device settings if this is enabled. This can be used to adapt text writing behaviour such as auto-correct or use the mute duration feature of the app.
Internet connection	The smart messenger requires an Internet connection to fulfill its purpose, so we assume it is connected at all times. However, more features can be enabled on WiFi than on a cellular connection (or any other type of Internet connection) because the resources are less costly.

3 Context-feature Mapping Model



Desktop	Modify name
Phone	Customization, Typing indicator
Driving	Oral reply, Audio reading
High	Photo/video, Readable file, Audio
High, Desktop	Unreadable file
High, WiFi	Previsualization
Meeting	Mute duration
Do not disturb	Mute duration
Auto-correct	Enable/disable auto-correct

Desktop	Modify name	Modifying the name of a conversation being non-essential feature of the smart messenger, it is only enabled on desktop.
Phone	Customization, Typing indicator	Since most mobile phones have different notification sounds in their settings, it makes more sense to enable notification customization for mobile phones only. Typing indicators are most commonly useful when the user isn't using any other program on his device at the same time so he/she waits for the message to arrive while looking at the messenger instead of relying on the notification sound to check the message. This is more often the case for mobile users rather than for desktop users.
Driving	Oral reply, Audio reading	
High	Photo/video, Readable file, Audio	When the battery is high, photos, videos, readable files and audio messages can be sent.
High, Desktop	Unreadable file	If there are enough power resources and the device is a desktop, unreadable files can be sent. Since a lot of unreadable files cannot be supported on mobile phones, only desktop computers allow to send unreadable files.
High, WiFi	Previsualization	When there is enough battery and there is no risk of charges due to using a cellular connection, previsualization should be enabled.
Meeting	Mute duration	
Do not disturb	Mute duration	
Auto-correct	Enable/disable auto-correct	If the smart messenger detects that auto-correct is enabled in the device settings, the user can choose to enable or disable it in the smart messenger.

3.1 Class Diagram

Let's assume a context where the user is working on his desktop which is plugged in. He/she is currently in a meeting and the device is connected to the WiFi.
This implies that the contexts *High, Desktop, Wi-fi* and *Meeting* are active. All mandatory features as well as *Photo/Video, Readable file, Unreadable file, Audio, Previsualization, Modify name* and *Mute duration* are therefore activated.