

Historical Style Generator *(HStyle)*

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Project Id - BS-SE-21-89



What does historical style generator mean?

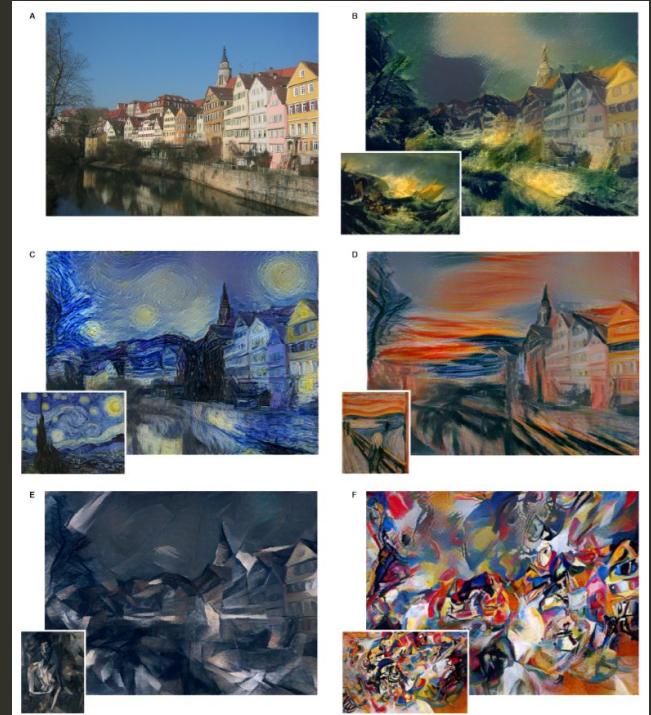
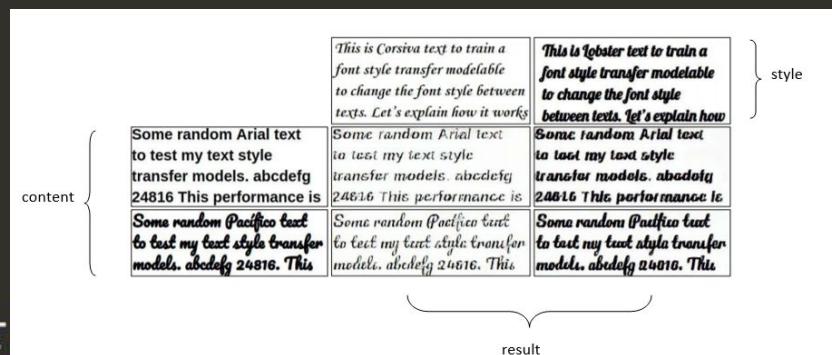
- Input:
 - Content image - Modern
 - Style image - Historical
- Output:
 - Content image with historical style

לעומת היגויים המודרניים שקיימים כיום, היגוי היסטורי מושך אליו יותר תשומת לב. נסיבותיו של היגוי היסטורי מושך אליו תשומת לב מושבצית. נסיבותיו של היגוי היסטורי מושך אליו תשומת לב מושבצית. נסיבותיו של היגוי היסטורי מושך אליו תשומת לב מושבצית. נסיבותיו של היגוי היסטורי מושך אליו תשומת לב מושבצית.



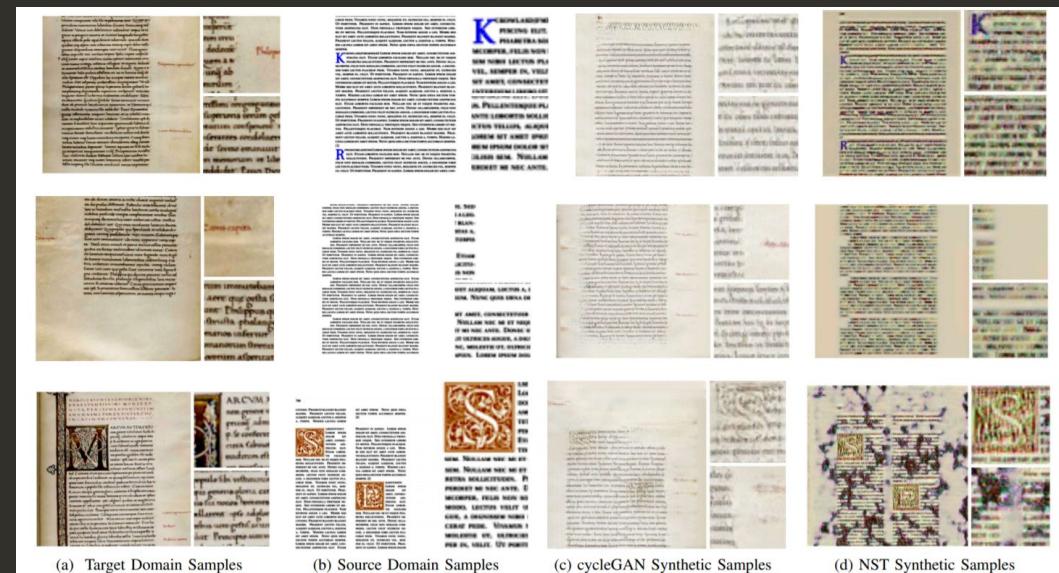
What has been done already in this domain?

- Gatys et.al original method (NST)
- Grayscale content and grayscale style
 - NST
 - GAN



What has been done already in this domain?

- Grayscale content and historical document
 - NST
 - CycleGan



Our Method

- First approach - Neural Style Transfer
 - Deep Learning
 - Evaluation

$$L_{\text{total}}(i, j, k) = \alpha L_{\text{content}}(i, k) + \frac{\beta}{N} L_{\text{style}}(j, k) + \gamma L_{\text{variation}}(k)$$

Diagram illustrating the components of the total loss function:

- Total loss
- Content image
- Style image
- Generated image
- Content Weight
- Number of style layers we used
- Variation Weight
- Style Weight

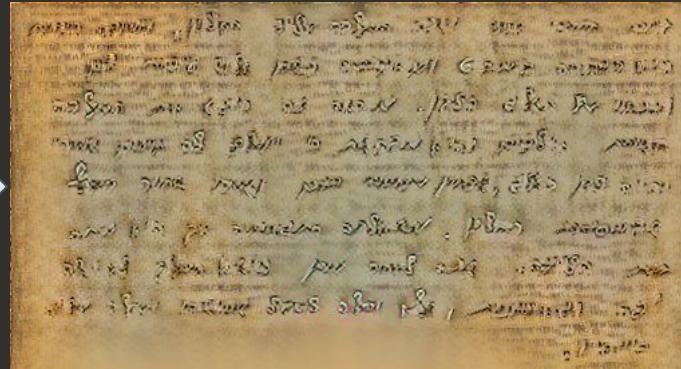
Results (1) - Original content



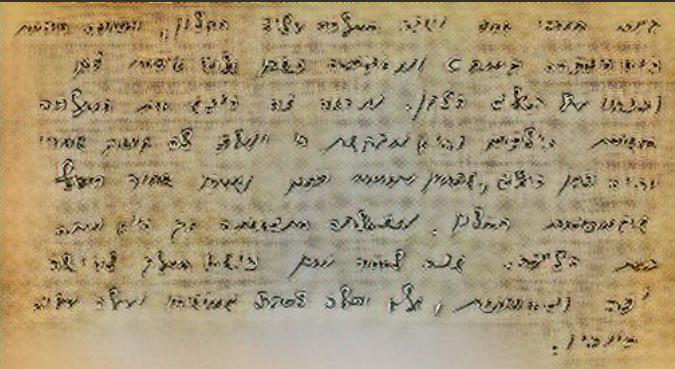
לע"ז הילוי יפה עלאה תטבה אלייך הקב"ה, והנהו יוכא
ג'וֹתָה כְּפִירָה לְמַדְכָּא וְמַעֲמָדָה כֵּאלֶיךָ וְמַלְאָךָ
עַמְלָיו לְבָשָׂר כְּסָדָה. נְכוֹת כֵּה דְּבָר וְהַנְּסָכָה
חַיָּה וְיַגְעַת רְאֵית אַנְגָּלָה וְוַיְלָגֶת בְּאַנְשָׁה
וְהַיְלָבָד כְּבָדָה, אֲבָל אַנְגָּלָה כְּבוֹן יְהָלָל כְּלָבָד
עַמְנָסָתָה וְלָמָדָה. נְמָנָה כְּפָנָה אֵין הַיְמָנָה
בְּלֹא אַתְּ עַמְנָה, וְלֹא וְלֹא סְפָרָה אַנְגָּלָה וְלֹא
וְלֹא.



weight 4 - block3_conv2



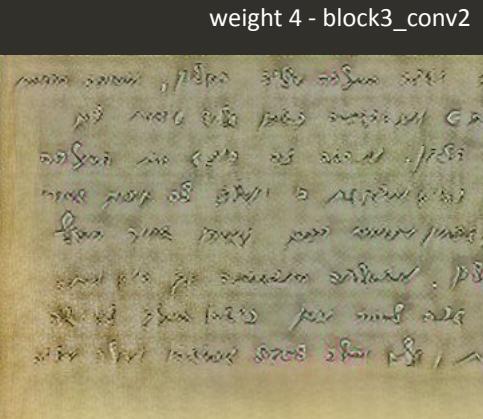
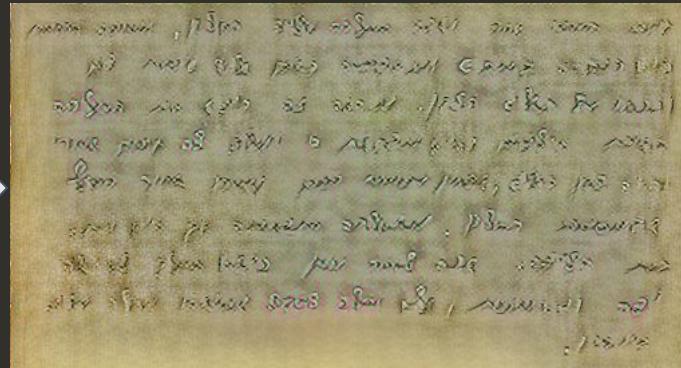
weight 5 - block3_conv2



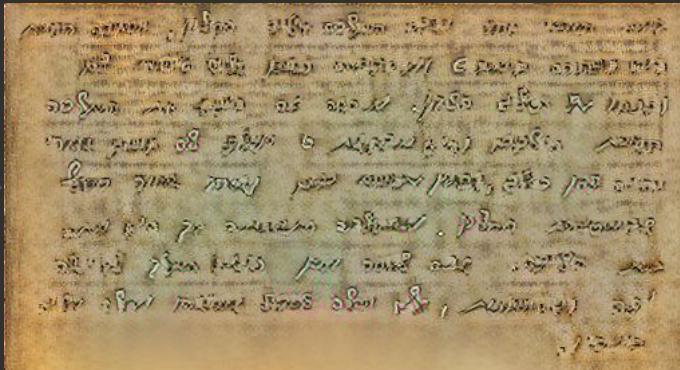
לע"ז הילוי יפה עלאה תטבה אלייך הקב"ה, והנהו יוכא
ג'וֹתָה כְּפִירָה לְמַדְכָּא וְמַעֲמָדָה כֵּאלֶיךָ וְמַלְאָךָ
עַמְלָיו לְבָשָׂר כְּסָדָה. נְכוֹת כֵּה דְּבָר וְהַנְּסָכָה
חַיָּה וְיַגְעַת רְאֵית אַנְגָּלָה וְוַיְלָגֶת בְּאַנְשָׁה
וְהַיְלָבָד כְּבָדָה, אֲבָל אַנְגָּלָה כְּבוֹן יְהָלָל כְּלָבָד
עַמְנָסָתָה וְלָמָדָה. נְמָנָה כְּפָנָה אֵין הַיְמָנָה
בְּלֹא אַתְּ עַמְנָה, וְלֹא וְלֹא סְפָרָה אַנְגָּלָה וְלֹא
וְלֹא.



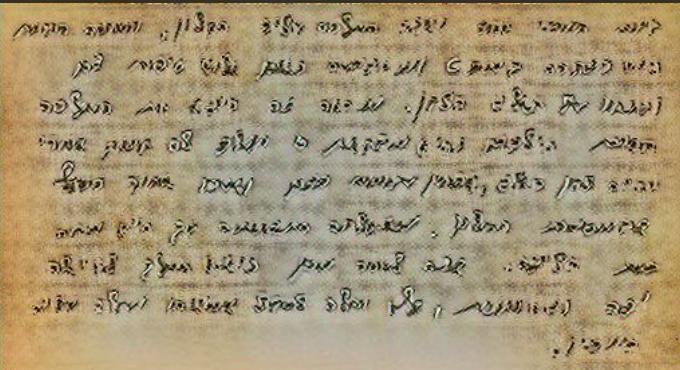
weight 3 - block3_conv2



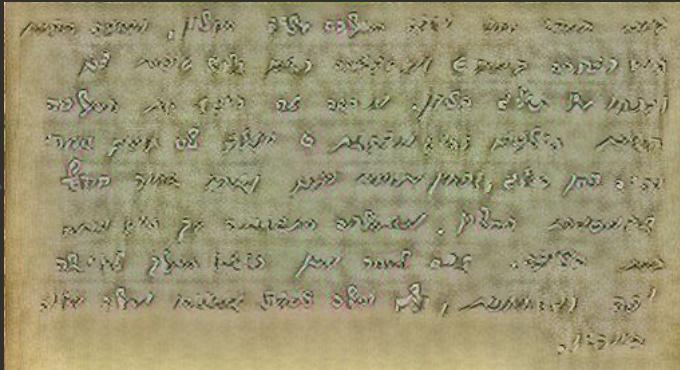
Results (2) - Dilate content



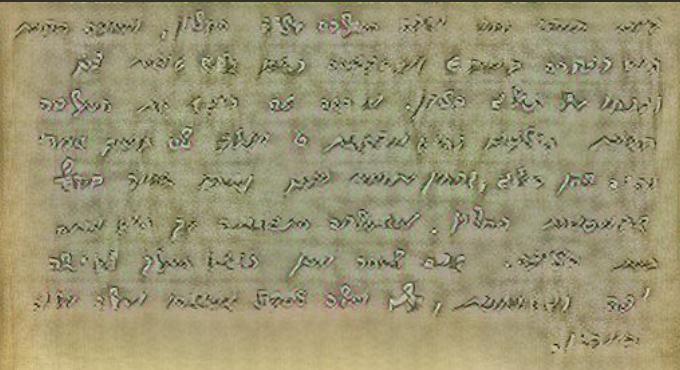
weight 4 - block3_conv2



weight 5 - block3_conv2



weight 3 - block3 conv2

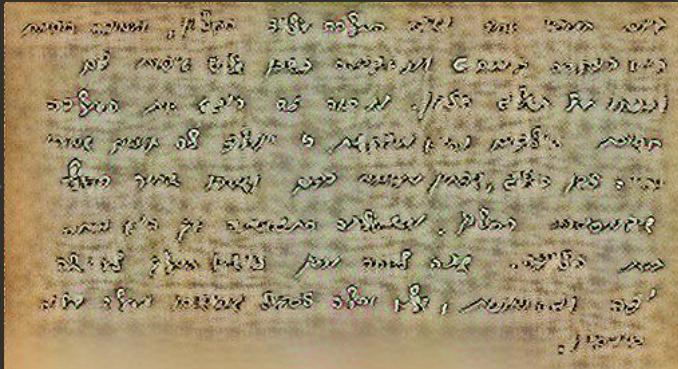


weight 4 - block3 conv2

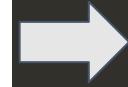
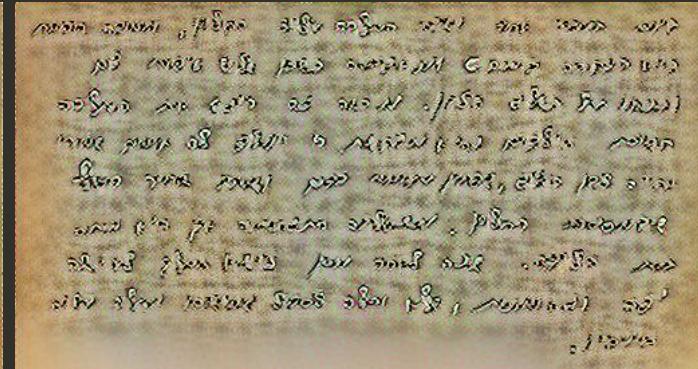
Results (3) - Binary content



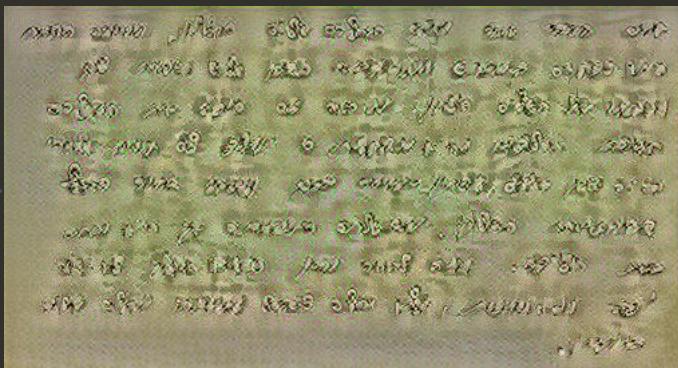
weight 5 - block3_conv2



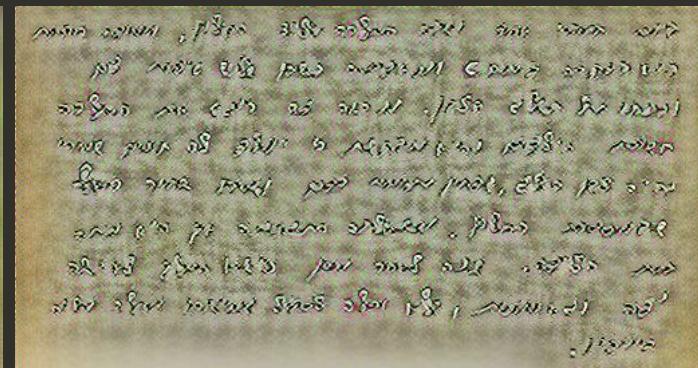
weight 6 - block3_conv2



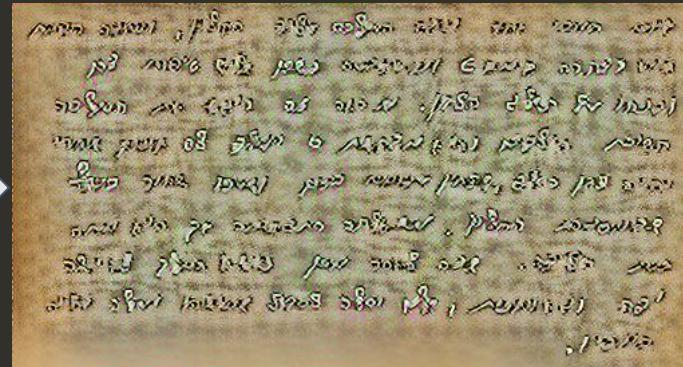
weight 4 - block4 conv2



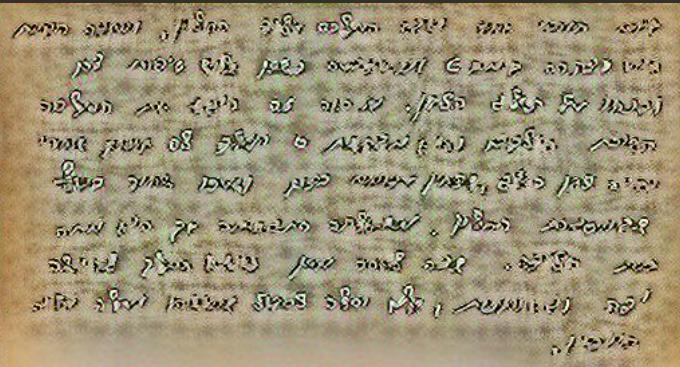
weight 5 - block3 conv2



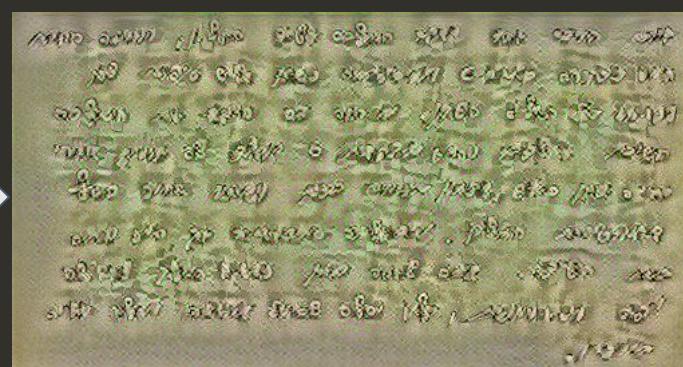
Results (4) - Binary-dilated content



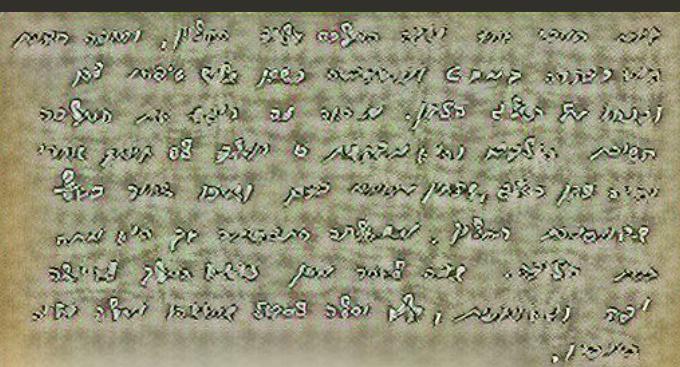
weight 5 - block3_conv2



weight 6 - block3_conv2



weight 4 - block4 conv2



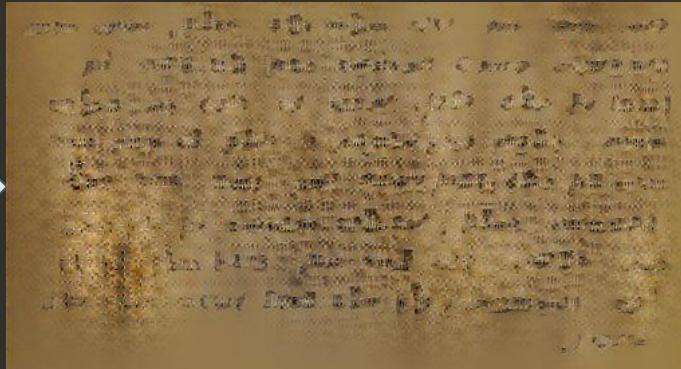
weight 5 - block3 conv2

Results (5) -

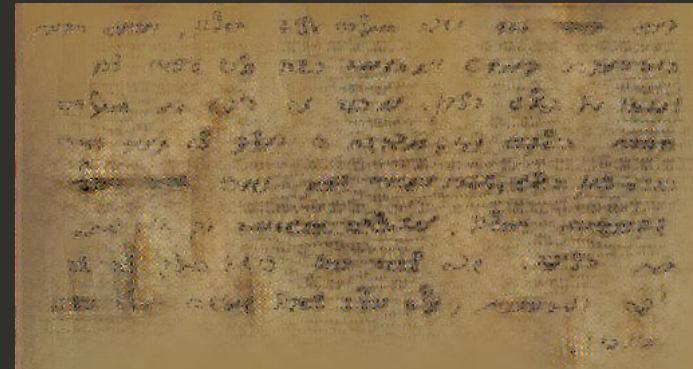
Average historical pixels background for original content



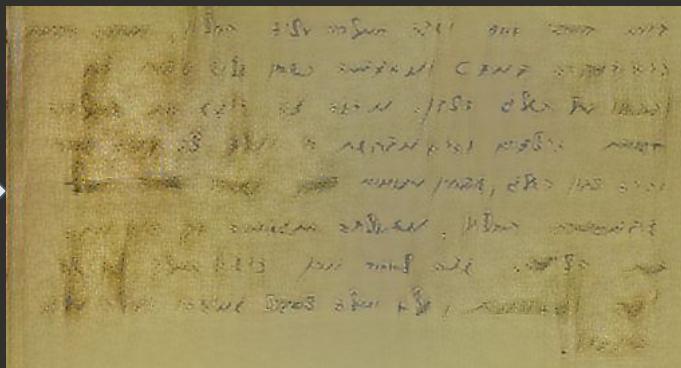
weight 4 - block3_conv2



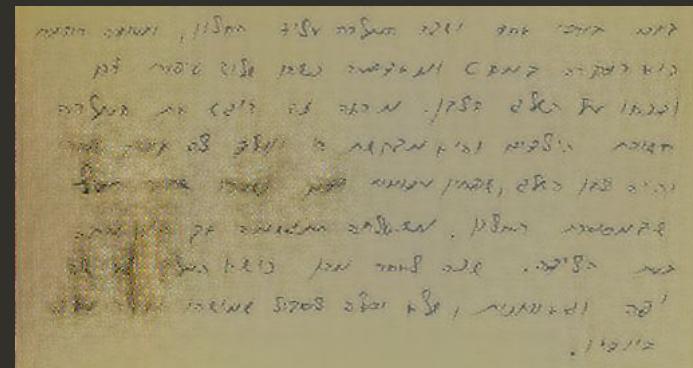
weight 6 - block3_conv2



weight 4 - block3 conv2



weight 5 - block3 conv2

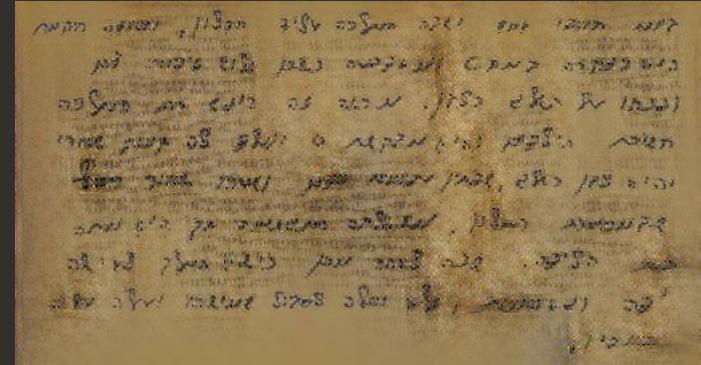


Results (6) -

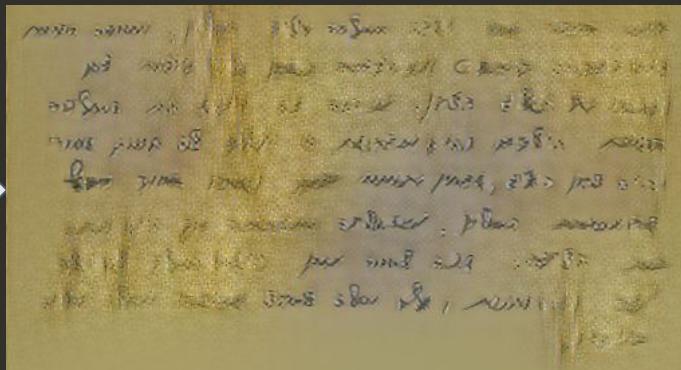
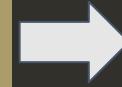
Average historical pixels background for dilated content



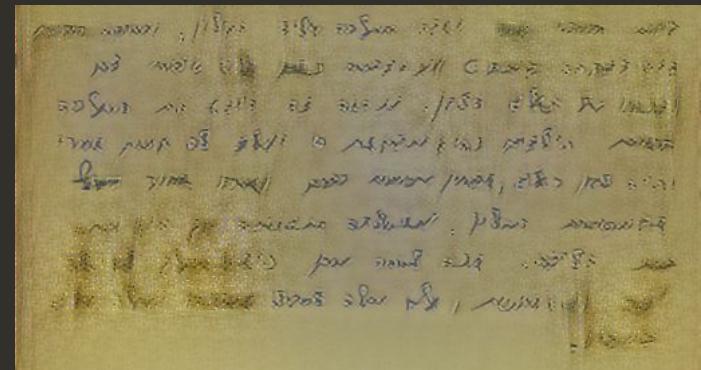
weight 4 - block3_conv2



weight 5 - block3_conv2



weight 3 - block3 conv3



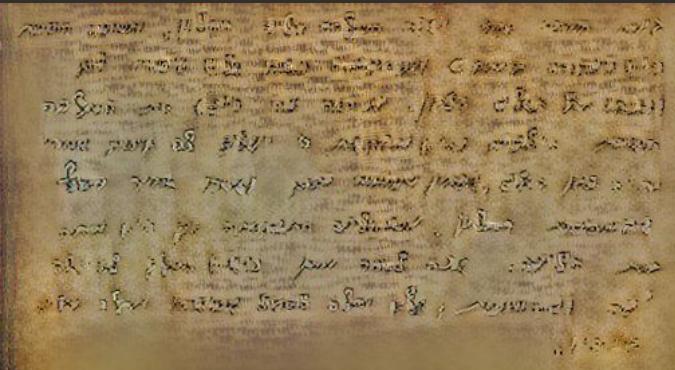
weight 4 - block3 conv2

Results (7) -

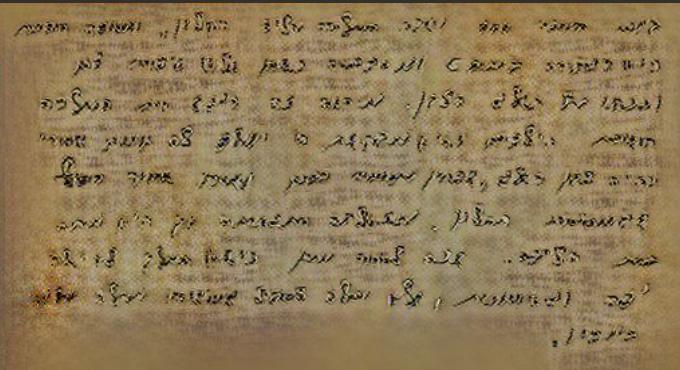
Average historical pixels background for binary content



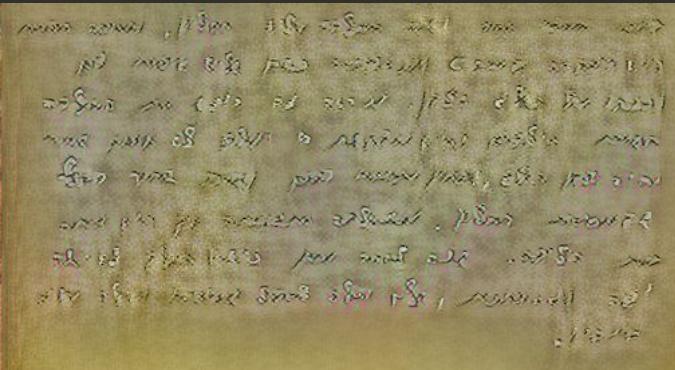
הנורו גורמי צמחי וצמחי הנמלטה צביז'ה, מושגיה חוקנאות
הנורו כטבורה קדום סאן נאומס רעל צביז'ה ופראן נן
הנורו טר זיגז'ה גזז'. נרכז זו כטבורה או גאנז'ה
הנורו זיגז'ה נמי נאומס גורו ט זיגז'ה זט זינור אונרי
זה יי' גז'ה צביז'ה, צביז'ה נמי נאומס גורו פאנץ' זינור צביז'ה
הנורו גזז'. נמי נאומס גורו צביז'ה זט זינור אונרי
הנורו גזז'. גורו גאנץ' נמי נאומס גורו צביז'ה גאנץ' גורו
הנורו גזז'ה, גורו גאנץ' נמי נאומס גורו צביז'ה גאנץ' גורו



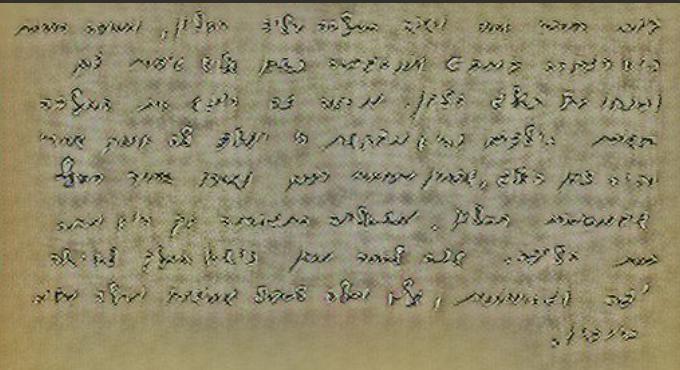
weight 4 - block3_conv2



weight 5 - block3_conv2

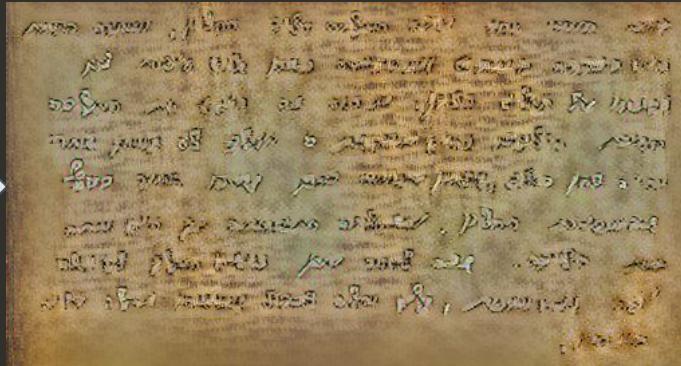


weight 4 - block3 conv2

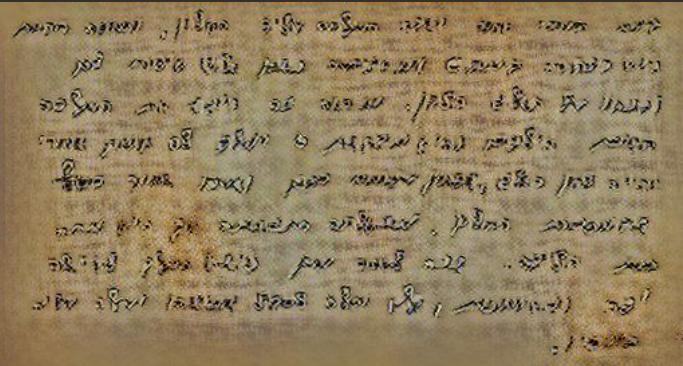


weight 5 - block3 conv2

Results (8) - Average historical pixels background for binary-dilated content



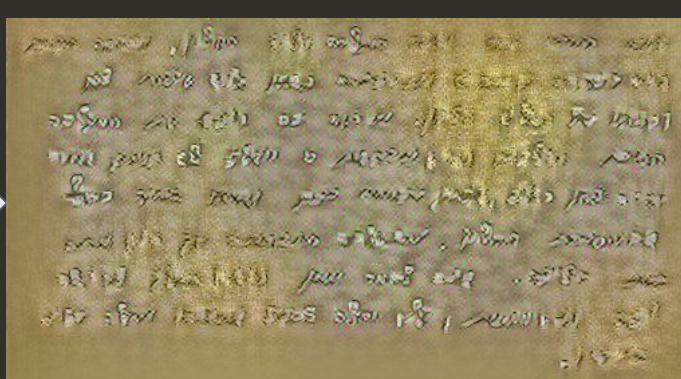
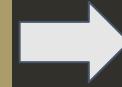
weight 4 - block3_conv2



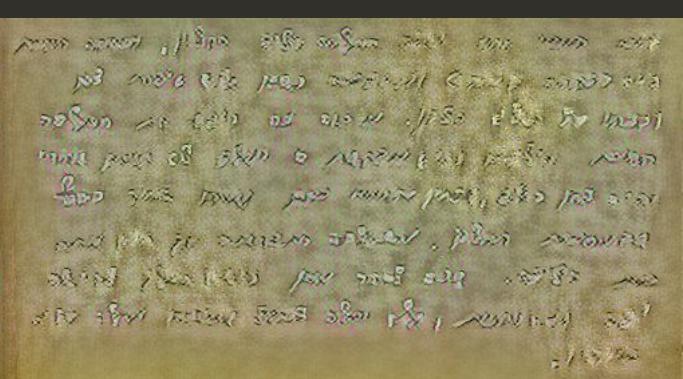
weight 5 - block3_conv2



הנורא מרכז, צהוב וענקי הנושא לאחסן נספחים בצדדים. אמצעו מושב הדרון
הנורא מרכז, צהוב וענקי הנושא לאחסן נספחים בצדדים. אמצעו מושב הדרון
הנורא מרכז, צהוב וענקי הנושא לאחסן נספחים בצדדים. אמצעו מושב הדרון



weight 3 - block3 conv3



weight 4 - block3 conv2

Project Management

- Project management application:
 - Teamwork: Work & Project Management Software
- Meetings:
 - Team Meetings
 - Academic Advisor Meetings
- Timeline management:
 - Teamwork Gantt chart

Project Environment

- Client side development:
 - Angular
 - HTML
 - CSS
 - TypeScript
- Version control:
 - Github
 - Google Drive
- Server side development:
 - Python
 - FastAPI
 - Uvicorn
 - Tensorflow
 - OpenCV
- Diagrams:
 - draw.io
- Research:
 - Google Colab

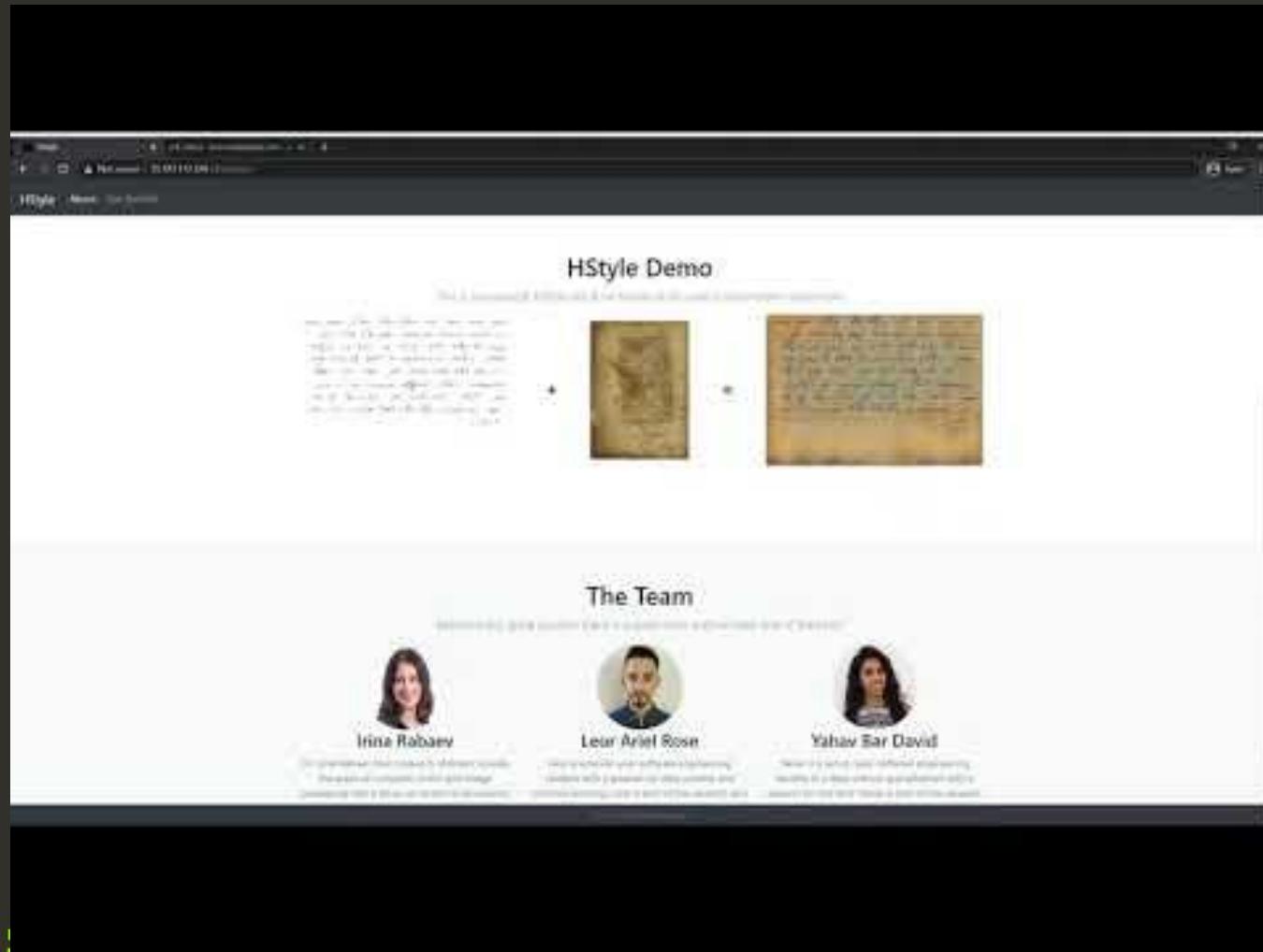
Requirements and Timeline



Risks

Source	Created By	Probability			Impact			Impact Areas			Mitigation/Response Plan	
		Low	Medium	High	Low	Medium	High	Result	Cost	Schedule	Performance	
1 Changes to Project Scope	Yahav B. 12/18/2020			7			7	49		X		Description - Changes to project scope are a common request, but can derail project timelines. Prevention - Every step will be defined and rethought in order to minimize changes to project scope.
2 Misunderstanding of Problem Domain	Yahav B. 12/18/2020			7			7	49		X		Description - There are many questions to be answered about how to apply document style transfer. Prevention - Reading and expanding our knowledge and every step will be considered and advised by our academic advisor.
3 Applying Concepts and Techniques Wrongly	Yahav B. 12/18/2020			7			7	49			X	Description - Document style transfer is a very complex idea and the techniques and mathematics are very confusing and hard to understand. This can cause applying these ideas wrongly. Prevention - Checking and testing every step by all team members.
4 Incompatible Server Architecture	Yahav B. 12/18/2020			7			7	49			X	Description - The finished web application will be dependent on a server environment chosen. Such environments vary in their support for web application programming languages and language versions. also this application will need hardware requirements relevant for this project. Prevention - Document necessary requirements and validating the server contains them before deployment.
5 Miscommunication	Yahav B. 12/18/2020			7		4		28		X		Description - The volume of communication regarding this project almost guarantees that miscommunications will occur. Prevention - The primary method of avoiding miscommunication is to document and verify verbal communications. For this project, the documentation and verification process will consist of meeting agendas, minutes and reports that will be shared.
6 Incorrect Design	Yahav B. 12/18/2020			7		4		28		X		Description - Design is the foundation of implementation, and errors in design can create an imperfect project. Prevention - Design documents will face internal review within the team and must be approved by all team members.
7 Uncompatible Resources for Research	Yahav B. 12/18/2020	4			4			16		X		Description - Resources like GPU and computation power can affect the speed and the progress of the research, causing slower and inefficient research. Prevention - No prevention can be applied in these circumstances.
8 Team Member Unavailability	Yahav B. 12/18/2020		7	1				7		X		Description - During this project, it is almost certain that some members of the team will be unavailable for certain periods due to illness or emergency. Prevention - Team members will alert at the first opportunity regarding potential absences, and coordinate with other members of the team to cover their responsibilities for the duration of the absence.
9 Deep Learning Method Failure	Yahav B. 12/18/2020		7	1				7		X	X	Description - Our first approach to solve this problem is with a deep learning model. This model can result in bad results. Prevention - No prevention can be applied, but in case this does happen we have a plan B (our second approach).
10 Lack of Experience with Relevant Technologies	Yahav B. 12/18/2020		7	1				7		X		Description - Team members may not have experience with the technologies used in this project. Prevention - Work will be assigned according to experience with the relevant technology. Team members are encouraged to ask questions when faced with something they don't understand. Team members with experience are expected to assist less experienced members. Team members are expected to independently research technologies during the summer break.
11 Evaluation and Testing of model	Yahav B. 12/18/2020		7	1				7		X		Description - One of the most difficult aspects in this project is how to test and evaluate the project. Prevention - Research will be done to understand various testing and evaluation techniques.

Demo



Thank you for your attention!

