

Prompt for GPT-3.5-Turbo:

{“role”: “system”, “content”: “Your task is to shorten MRI reports by summarizing abnormalities and removing certain information. Please summarize the abnormalities in the report above in an one-level enumerated list without indents. Only include abnormalities. Your summarization must not include items that are normal or not evident (like “No ...”, or “No evidence of ...”, or “Normal ...” or “Unremarkable ...”). If there is no abnormalities in this report, write “1. Study is unremarkable”.\n\n”

```
{
  "role": "user", "content": "[DEMONSTRATION REPORT 1]"}
{
  "role": "assistant", "content": "[HUMAN-WRITTEN-SUMMARY 1]"}
...
{
  "role": "user", "content": "[DEMONSTRATION REPORT 3]"}
{
  "role": "assistant", "content": "[HUMAN-WRITTEN-SUMMARY 3]"}
...
{
  "role": "user", "content": "[REPORT TO BE SUMMARIZED]"}
}
```

We collect 20 summaries written by trained medical professionals as in-context demonstrations

Demonstration Report 1

Human-written
Summary 1

Demonstration Report 2

Report 2

Summary 2

Demonstration Report 20

Human-written Summary 30



Given [REPORT TO BE SUMMARIZED], we select 3 in-context demonstrations from the collection of human-written summaries as follows:

Randomly select 1 normal report;

Select 2 abnormal report that has the highest similarity to [REPORT TO BE SUMMARIZED] by SentenceTransformer model ('all-MiniLM-L6-v2')

Original Report (sic)

MRI of the brain without and with contrast, XX/XX/XXXX CLINICAL HISTORY: 73 years Male. NSCLC with brain mets. Progression of disease in liver and lung COMPARISON: XX/XX/XXXX TECHNIQUE: MRI of the brain is performed using T1-weighted pre- and postcontrast sagittal imaging, axial pre- and postcontrast T1-weighted imaging, coronal postcontrast T1-weighted imaging, axial FLAIR and T2-weighted imaging, and axial diffusion weighted imaging with ADC mapping. Scanning is performed on a 1.5 Tesla magnet. 20cc of Multi-Hance gadolinium contrast was administered intravenously. FINDINGS: There is redemonstration of a patchily of hyperintense T1 and T2 signal with patchy postcontrast enhancement, evidence for susceptibility, without evidence for interval progression . Generalized prominence of bilateral cerebral sulci with fullness of ventricular system is broadly age-appropriate . Numerous punctate, patchy and confluent hyperintense T2 and FLAIR signal areas in bilateral cerebral white matter are nonspecific, however in this age group, likely represent changes for chronic microvascular ischemia . No acute intracranial hemorrhage is seen. The ventricular system is normal without shift of midline structures. No extra-axial fluid collections or hydrocephalus is appreciated. The gray-white matter differentiation is normal. Diffusion weighted imaging is normal, without evidence of acute or subacute infarction. The fourth ventricle is normal in size. The cranio-vertebral region is unremarkable without evidence for Chiari malformation. The visualized orbits, mastoid air cells are unremarkable for technique. Polypoid mucosal thickening is seen in bilateral ethmoidal sinuses with small bilateral maxillary mucosal retention cyst. IMPRESSION: 1. Stable metastatic deposit at the left side of superior cerebellar vermis 2. Age-appropriate brain volume loss with changes for chronic microvascular ischemia . 3. No evidence for acute intracranial hemorrhage, hydrocephalus or extra-axial collections.

GPT-3.5-turbo Summarization

1. Stable metastatic deposit in the left superior cerebellar vermis
2. Age-appropriate brain volume loss
3. Unremarkable craniio-vertebral region without evidence of Chiari Malformation.
4. Changes in chronic microvascular ischemia
5. Small bilateral maxillary mucosal retention cysts
6. No evidence for acute intracranial hemorrhage, hydrocephalus or extra-axial collections.

GPT-3.5-turbo
Filtering out Normal

1. Stable metastatic deposit in the left superior cerebellar vermis
2. Age-appropriate brain volume loss
3. Changes in chronic microvascular ischemia
4. Small bilateral maxillary mucosal retention cysts

GPT-3.5-turbo
Removing description of temporal
comparison and sizes

1. Metastatic deposit in the left superior cerebellar vermis
2. Age-appropriate brain volume loss
3. Chronic microvascular ischemia
4. Bilateral maxillary mucosal retention cysts

Prompt for GPT-3.5-turbo:

```
{'role': 'system', 'content': '\nYour goal is to modify a list of radiology findings with the following rules:\n\n1. Remove all the items in the list that are fully normal (i.e. items that indicates something is normal or unremarkable, or nothing special is found, or no evidence or nothing significant). Write "<Removed>" for the removed items.\n\n2. If an item in the list contains both normal and abnormal information, only remove the normal parts. Keep the abnormal parts in the item, and do not delete the item. Make sure you remove sentences starting with "No ..." or "Unremarkable ...".\n\n3. Please also remove all phrases that contain "clinical correlation" or suggestions for further evaluation with additional studies (such as recommending future MRIs).\n\n4. Do not remove other abnormal information unless specified above. Do not remove benign abnormalities.\n\nYour output should have the same number of rows as the input.\n'}
```

```
{ 'role': 'user', 'content': '\n1. Redemonstration of postsurgical changes consistent with right subtotal parotidectomy and submandibulectomy\n2. No evidence of focal mass or abnormal enhancement within the left parotid gland or left submandibular gland.\n3. No abnormal enhancement in the soft tissues of the neck\n4. Normal cerebellum, brainstem, and visualized spinal cord without focal signal abnormality\n5. Unchanged irregular soft tissue thickening with enhancement within the surgical bed consistent with postsurgical scarring\n6. Stable postsurgical changes in the midline posterior fossa consistent with prior exam\n7. Unremarkable midline structures and posterior fossa.\n8. No evidence of recurrence in left chest wall or right breast status post lumpectomy, axillary nodal sampling, and radiation therapy.\n9. Benign prominence of the bifrontal subarachnoid spaces of infancy\n'}
```

```
{'role': 'assistant', 'Content': '\n1. Redemonstration of postsurgical changes consistent with right subtotal parotidectomy and submandibulectomy\n2. <Removed>\n3. <Removed>\n4. <Removed>\n5. Unchanged irregular soft tissue thickening with enhancement within the surgical bed consistent with postsurgical scarring\n6. Stable postsurgical changes in the midline posterior fossa consistent with prior exam\n7. <Removed>\n8. <Removed>\n9. Benign prominence of the bifrontal subarachnoid spaces of infancy\n'}
```

```
{'role': 'user', 'content': '\n1. Small lesion in the midline anterior pons measuring 8mm in size is favored to represent a cavernous malformation, unchanged since 06/2012. Further evaluation by a CT or MR angiogram is suggested.\n2. Subtle hypointense T1 signal involving the subcortical white matter of the medial left temporal lobe. Clinical correlation is recommended.\n3. No lesions along the callosal septal interface or posterior fossa involvement.\n4. Partial empty sella. Otherwise, no evidence of additional abnormalities.\n5. Postsurgical changes consistent with Chiari I decompression. No definitive evidence of meningioma.\n6. 9 mm posterior right insular lesion, stable in size.\n7. Recommend next bilateral contrast-enhanced breast MRI in 12 months.\n8. No enlarged posterior fossa.\n'}
```

```
{'role': 'assistant', 'content': '\n1. Small lesion in the midline anterior pons measuring 8mm in size is favored to represent a cavernous malformation, unchanged since 06/2012.\n2. Subtle hypointense T1 signal involving the subcortical white matter of the medial left temporal lobe.\n3. <Removed>\n4. Partial empty sella.\n5. Postsurgical changes consistent with Chiari I decompression.\n6. 9 mm posterior right insular lesion, stable in size.\n7. <Removed>\n8. <Removed>\n'}
```

```
{'role': 'user', 'content': '\n1. No acute hemorrhage on the left temporal lobe.\n2. Unremarkable pituitary gland.\n3. No enlarged internal mammary\n4. No acute infarct, hemorrhage, mass effect or midline shift. Ventricles are unchanged in size and configuration. Basal cisterns are not effaced. Midline structures and posterior fossa are otherwise unremarkable.\n'}
```

```
{ 'role': 'assistant', 'intent': '\n1. <Removed>\n2. <Removed>\n3. <Removed>\n4. <Removed>\n' }
```

```
{ 'role': 'user', 'content': '\n1. Non-specific cerebellar lesion in the midline vermian, notable for elevated T2 FLAIR signal without associated enhancement or diffusion restriction. This lesion remains of uncertain etiology and indeterminate; low-grade neoplasm is not excluded. Recommend continued close interval follow-up. Neurosurgical consultation may be of further benefit if not previously obtained.\n' }
```

```
{'role': 'assistant', 'content': '\n1. Nonspecific cerebellar lesion in the midline vermis, notable for elevated T2 FLAIR signal without associated enhancement or diffusion restriction. This lesion remains of uncertain etiology and indeterminant; low-grade neoplasm is not excluded.\n'}
```

```
{'role': 'user', 'content': [REPORT INPUT]}
```

Prompt for GPT-3.5-turbo:

{ 'role': 'system', 'content': '\nYour goal is to modify a list of radiology findings with the following rules:\n\n1. Remove all phrases that indicates a comparison to a previous report, such as redemonstration, stable, stable in comparison, unchanged, compared to, prior exam, interval improvement, interval worsening, interval increase, interval reduction, old, increase in size, reduction in size ... \n\n2. Please also remove all numerical size measurements, such as "8 mm" or "3 cm". Do not remove non-numerical description of size, such as "small", "minimal" or "large".\n\n3. Please remove all date phrases such as "06/20/2012" from all items.\n\n4. Please remove all references to patient history, such as "compatible with history of ..." \n\nYour output should have the same number of rows as the input.\n' }

```
{
  "role": "user",
  "content": "\n1. Redemonstration of postsurgical changes consistent with right subtotal parotidectomy and submandibulectomy\n2. Unchanged irregular soft tissue thickening with enhancement within the surgical bed consistent with postsurgical scarring\n3. Stable postsurgical changes in the midline posterior fossa consistent with prior exam\n4. Two left frontal nodules increased in size\n5. Extensive confluent symmetric T2/FLAIR signal abnormality involving both cerebral hemispheres, more notably within the frontal, anterior parietal, and anterior temporal lobes, compatible with provided history of leukodystrophy.\n"}

```

{role': 'assistant', 'content': '\n1. Postsurgical changes consistent with right subtotal parotidectomy and submandibulectomy\n2. Irregular soft tissue thickening with enhancement within the surgical bed consistent with postsurgical scarring\n3. Postsurgical changes in the midline posterior fossa\n4. Two left frontal nodules\n5. Extensive confluent symmetric T2/FLAIR signal abnormality involving both cerebral hemispheres, more notably within the frontal, anterior parietal, and anterior temporal lobes.\n'}

{ 'role': 'user', 'content': '\n1. Small lesion in the midline anterior pons measuring 8mm in size is favored to represent a cavernous malformation, unchanged since 06/2012. Further evaluation by a CT or MR angiogram is suggested.\n2. Subtle hypointense T1 signal involving the subcortical white matter of the medial left temporal lobe. Clinical correlation is recommended.\n3. Partial empty sella.\n4. Postsurgical changes consistent with Chiari I decompression.\n5. 9 mm posterior right insular lesion, stable in size.\n6. Unchanged, benign tumor in frontal lobe.\n7. Interval increased extent of diffusion restriction at bilateral temporal occipital region '\n}

{'role': 'assistant', 'content': '\n1. Small lesion midline anterior pons is favored to represent a cavernous malformation.\n2. Subtle hypointense T1 signal involving the subcortical white matter of the medial left temporal lobe.\n3. Partial empty sella.\n4. Postsurgical changes consistent with Chiari I decompression.\n5. Posterior right insular lesion.\n6. Benign tumor in frontal lobe.\n7. Diffusion restriction at bilateral temporal occipital region'}\n

{'role': 'user', 'content': '\n1. Benign prominence of the bifrontal subarachnoid spaces of infancy\n'}
{'role': 'assistant', 'content': '\n1. Benign prominence of the bifrontal subarachnoid spaces of infancy\n'}

```
{'role': 'user', 'content': [REPORT INPUT]}
```